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A NEW GENUS AND SPECIES OF FURNARIID (AVES: FURNARIIDAE) FROM THE COCOA-GROWING REGION OF SOUTHEASTERN BAHIA, BRAZIL

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ABSTRACT.—We here describe *Acrobatornis fonsecai*, a new genus and species in the Furnariidae, from the Atlantic Forest of southeastern Bahia, Brazil. Among the outstanding features of this small, arboreal form are: black-and-gray definitive plumage lacking any rufous; juvenal plumage markedly different from adult; stout, bright-pink legs and feet; and its acrobatic foraging behavior involving almost constant inverted hangs on foliage and scansorial creeping along the undersides of canopy limbs. Analysis of morphology, vocalizations, and behavior suggest to us a phylogenetic position close to *Asthenes* and *Crani-oleuca*; in some respects, it appears close to the equally obscure *Xenerpestes* and *Metopothrix*. New data on the morphology, vocalizations, and behavior of several furnariids possibly related to *Acrobatornis* are presented in the context of intrafamilial relationships. We theorize that *Acrobatornis* could have colonized its current range during an ancient period of continental semiaridity that promoted the expansion of stick-nesting prototypes from a southern, Chaco-Patagonian/Pantanal center, and today represents a relict that survived by adapting to build its stick-nest in the relatively dry, open, canopy of leguminaceous trees of the contemporary humid forest in southeastern Bahia. Another theory of origin places emphasis on the fact that the closest relatives of practically all (if not all) other birds syntopic with *Acrobatornis* are of primarily Amazonian distribution. *Acrobatornis fonsecai* has a most unusual distribution in a restricted region in which lowland Atlantic Forest has been converted virtually entirely to cocoa plantations. Until very recently a lucrative and vitally important source of income for Bahia, the economic base for cocoa production has suffered catastrophic, apparently irrecoverable, decline owing to “witch’s broom” disease, which has proven resistant to all forms of control. The predictable wave to cut and sell the tall trees shading failing cocoa plantations has already begun in earnest with the consequence that the remnant forest canopies in this region, upon which *Acrobatornis fonsecai* is totally dependent, are being rapidly destroyed. This remarkable new furnariid and the secrets it holds for elucidation of phylogeny, evolutionary history, speciation patterns, and zoogeography, if not safeguarded immediately, when its habitat is still for sale, could disappear in the coming decade. *Received 23 April 1996, accepted 21 May 1996.*

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RESUMO.—*Acrobatornis fONSECAI*, um novo gênero e nova espécie de Furnariidae, é descrito da Mata Atlântica do sudeste da Bahia, Brasil. Dentre os aspectos notáveis desta pequena ave arborícola estão: a sua plumagem definitiva cinza e preta sem qualquer avermelhado; plumagem juvenil bem diferenciada da adulta; patas e pés fortes de coloração rosa vivo; e seu comportamento acrobático de forrageamento de envolve uma quase permanente posição invertida dependurada na folhagem e uma “escalada negativa” ao longo das superfícies inferiores dos galhos da copa. Através de análises da morfologia, vocalizações, e comportamento, é sugerido uma posição filogenética de *Acrobatornis* próximo aos *Asthenes* e *Cranioleuca*; em alguns aspectos o novo gênero mostra-se próximo aos igualmente obscuros *Xenerpestes* e *Metopothrix*. Novos dados sobre a morfologia, vocalizações, e comportamento de vários Furnariidae relacionados a *Acrobatornis* são apresentados no contexto das afinidades intrafamiliares. É teorizado que *Acrobatornis* colonizou sua atual área de distribuição durante um período remoto de semi-aridez continental, que promoveu a expansão oriunda do sul, Chaco e Patagônia, dos protótipos construtores de ninhos de graveto. Ele hoje representaria uma “reliquia” que conseguiu sobreviver, no sudeste da Bahia, ao período úmido contemporâneo, por adaptar construir seu ninho de gravetos nas copas relativamente secas e abertas das árvores leguminosas. Uma outra teoria sobre a origem enfatiza o fato de que os parentes mais próximos de quase a totalidade (se não todos) das aves sintópicas com *Acrobatornis* possuem uma distribuição principalmente amazônica. Num padrão incomum de distribuição, *Acrobatornis fONSECAI* ocorre numa região restrita da Mata Atlântica de tabuleiro do sudeste da Bahia, que tem sido quase completamente convertida em plantações de cacau. A cacauicultura, até muito recentemente lucrativa e substancial fonte de receita para a Bahia, tem sofrido um catastrófico, aparentemente irreversível, declínio na produção devido à disseminação da “vassoura-de-bruxa,” doença causada por fungos, que tem resistido a diversas formas de controle. De maneira grave, as grandes árvores copadas, remanescentes da floresta íntegra, das quais *Acrobatornis fONSECAI* é totalmente dependente, já estão sendo cortadas e vendidas. Este notável novo furnariídeo, e os segredos que ele guarda para elucidação da filogenia, história evolutiva, padrões de especiação e zoogeografia, se não imediatamente salvaguardados, quando o seu hábitat ainda está à venda, poderão desaparecer na próxima década.

From a continental perspective, the Neotropical family Furnariidae has undergone a geographical and ecological radiation, paralleled by a diversity of form and function, without equal in the world of birds. The Furnariidae contains more than 230 species in 53 genera (as currently defined; Sibley and Monroe 1990, 1993). To this magnificent assemblage we must now add one more genus and species, a member of such singular appearance, ecology, and distribution as to mark it truly outstanding even in a family characterized by adaptive extremes. Perhaps most remarkable, however, is our discovery of this new form in the remnant Atlantic Forest of southeastern Bahia, a heavily populated region in which we never would have predicted the contemporary existence of a furnariid of such affinities.

On 26 January 1988, in search of habitat that might harbor the little-known Stresemann's Bristlefront (*Merulaxis stresemanni*), Whitney located a slope cloaked in undisturbed Atlantic Forest in the serra das Lon-

tras above the village of Itatingui in the cocoa-growing region of southern Bahia. Although observations were precluded by rain, the area was targeted for a detailed avifaunal survey. In November 1994, following an ornithological investigation of selected points in interior Minas Gerais and Bahia ending in the city of Salvador, Whitney suggested to Pacheco and Paulo Sérgio M. da Fonseca that they make an introductory visit to Itatingui along their return drive to Rio de Janeiro. Documentation of a largely unknown avifauna in Atlantic Forest fragments in the highest parts of the serra de Ouricana approximately 125 km WNW of Itatingui (Gonzaga et al. 1995), and recent discoveries of undescribed species there (Gonzaga and Pacheco 1995, Pacheco and Gonzaga 1995), indicated an urgent need to explore the Atlantic Forest of southern Bahia north of the Rio Jequitinhonha and interior from the relatively well known coastal forests. Thus, on the morning of 17 November 1994, while observing birds in a mixed-species flock foraging in the canopy of trees shading a cocoa plantation at the edge of undisturbed forest above Itatingui, Fonseca called Pacheco's attention to a strange pair of birds, one gray-and-black and the other largely brown, creeping along the undersides of limbs, and hanging acrobatically on clusters of foliage and flowers of a tall *Croton* tree. They were able to observe the birds for several minutes, noting details of the plumage and foraging behavior. It was clearly a species unknown from Brazil, and quite possibly unknown altogether. After discussion of this exciting news with Gonzaga and Whitney, Pacheco, Fonseca, and Claudia Bauer returned to Itatingui in late January 1995 and obtained four specimens, including two of each "morph" they had identified previously.

It was clear even on cursory inspection that the specimens represented a species unknown to science, and further examination indicated a strong probability that a new genus would have to be erected as well. Rather than describe the new form immediately, it was decided to return to Itatingui in October, when the birds would likely be breeding and vocal, so that more ecological and distributional information could be gathered. Thus, from 2 to 12 October 1995, Pacheco, Fonseca, Whitney, and Barth explored the serra das Lontras above Itatingui, and a number of other localities in the general region. This expedition was highly successful, resulting in: the discovery and collection of the nest and the location of 52 additional nest sites which defined, we think to a large extent, the distributional limits of the new bird; the tape-recording of several individuals, which documented the vocal repertoire of the species almost completely; the tape-recording and collection of two additional voucher specimens, which permitted preparation of a skeleton and preservation of additional biochemical material; and the production of photographs and



FIG. 1. Adult *Acrobotornis fonsecai*, gen. nov. sp. nov. Video image captured from Hi-8 format original (11 Oct. 1995 near Camacan, Bahia; video by Whitney).

video recordings of habitat, nests, and foraging maneuvers. Furthermore, we determined that the known distribution of the new species was entirely coincident with the cocoa-growing province of southern Bahia—the consequences of which appear to be devastating for the continued survival of the new bird. Finally, in March 1996, Whitney located the new species at additional localities in the cocoa-growing region slightly north and west of previously documented ones.

Consideration of all these data, informed through extensive personal field experience with the Furnariidae, including all but one genus and 11 currently recognized species, and comparison with museum anatomical and skin specimens from a cross-section of potentially related genera, convinces us that the unknown form indeed represents a new genus and species in the Furnariidae. The descriptions follow.

Acrobotornis gen. nov.

TYPE-SPECIES: *Acrobotornis fonsecai* Pacheco, Whitney, and Gonzaga.

DIAGNOSIS.—A small, arboreal furnariid (weight 14 g) completely lacking rufous in definitive plumage, and largely orange-tawny in juvenal plumage. Adults basically gray with black wings, tail, and cap (Frontispiece, Fig. 1). Tail shorter than the wing (with tail/wing ratio varying from 0.86 to 0.92, with an average of 0.89); strongly graduated and slightly

stiffened, composed of 12 rectrices. Two inner pairs of rectrices strongly acuminate at the tips and deeply excised on the inner web; the acuminations at the tips of the rectrices decreases gradually from innermost to outermost, so that outermost are almost blunt, cuneiform in shape and only slightly excised on the inner web. Outer pair of rectrices about 60% of the length of the innermost pair, and projecting far beyond the under tail coverts. Wing relatively long in comparison to most furnariids of similar mass, and extending well beyond base of the tail. Seventh to ninth primaries longest and approximately equal in length; sixth primary only slightly shorter; tenth and fifth primaries of nearly equal length and about 5 mm shorter than longest ones.

Bill compressed, short and pointed; culmen slightly decurved, skull pseudo-schizorhinal (Fig. 2A). Tarsi short and strong (Fig. 2A), conspicuously pink-colored. Hind toe thicker than front toes; claw of hind toe slightly shorter than the length of the toe itself. Sternum two-notched. Syrinx typically furnarioid, with well-defined Membranae tracheales, Processi vocales without "horns," and two pairs of intrinsic syringeal muscles (Fig. 3). Membranae tracheales limited posteriorly by A-2 (A-3 vestigial), and anteriorly by a drum formed by the partial fusion of two elements.

SPECIMENS EXAMINED: SKINS.—Only specimens actually measured are listed; many others were compared superficially. *Acrobatornis fonsecai*, gen. nov, sp. nov.: Brazil: Bahia, 2 males (Museu de Zoologia da Univ. de São Paulo [hereafter MZUSP] No. 74154 [holotype], Museu Paraense Emilio Goeldi [hereafter MPEG] No. 52345), 1 female (MZUSP 74155), and 3 sex unk. (MZUSP 74156 [juv.], MPEG 52346 [juv.], and Louisiana State Univ. Museum of Natural Science [hereafter LSUMZ] 160000 [ad.]). *Cranioleuca pyrrhophia*: Bolivia: Santa Cruz, 3 males (LSUMZ 124033, 124036, 124040). *C. curtata*: Peru: San Martín, 1 male (LSUMZ 86368); Pasco, 1 male (LSUMZ 130232); Ayacucho, 1 male (LSUMZ 69428); Bolivia: Cochabamba, 1 male (LSUMZ 37666). *C. pallida*: Brazil: São Paulo, 1 male (LSUMZ 63352). *C. albiceps*: Bolivia: La Paz, 3 males (LSUMZ 95950, 101981, 101983). *Asthenes dorbignyi*: Peru: Arequipa, 2 males (*arequipae*: LSUMZ 114142, 119197); Bolivia: La Paz, 2 males (*consobrina*: LSUMZ 101995, 101996). *A. baeri*: Bolivia: Santa Cruz, 3 males (LSUMZ 153692, 153693, 153698); Argentina: Corrientes, 1 male (LSUMZ 54632); Uruguay: 1 male (Academy of Natural Sciences [hereafter ANSP] No. 169843). *A. patagonica*: Argentina: Chubut, 2 (LSUMZ 73269, ANSP 186350). *Thripophaga fusciceps*: Bolivia: Beni, 2 males, 1 female (LSUMZ 124062, 124063, 124065). *Phacellodomus sibilatrix*: Bolivia: Santa Cruz, 2 males, 1 female (LSUMZ 153700, 153701, 153702); Argentina, Chaco, 1 male (LSUMZ 83932). *P. rufifrons*: Brazil: Minas Gerais, 2 males (LSUMZ 65165, 65166), Mato Grosso, 1 male (LSUMZ 80295); Bolivia: Santa Cruz, 2 males (LSUMZ 124070, 124074). *Siptornis striaticollis*: Peru: Cajamarca, 3 males (LSUMZ 87015, 87016, 87017); Colombia: Huila, 1 male (ANSP 155470). *Xenerpestes minlosi*: Panama: Darién, 1 sex unk., (ANSP 150153); Colombia: Bolívar, 1 female (ANSP 160747). *X. singularis*: Ecuador: Morona-Santiago, 1 female (ANSP 176812), Zamora Chinchipe, 1 female (ANSP 185397); Peru: San Martín, 2 females, 1 sex unk. (LSUMZ 84690, 84691, 84692). *Metopothrix aurantiacus*: Ecuador: Napo, 2 males (LSUMZ 70898, 82963); Peru: Loreto, 1 male (LSUMZ 119657). *Margarornis squaniger*: Bolivia: La Paz, 3 males (LSUMZ 95985, 95989, 95991).

SPECIMENS EXAMINED: ANATOMICALS.—Skulls illustrated: *Acrobatornis fonsecai*, gen. nov., sp. nov.: Brazil: Bahia (MPEG 3762 from skin specimen MPEG 52345). *Cranioleuca pyrrhophia*: Bolivia: Santa Cruz (LSUMZ 125825). *C. albiceps*: Bolivia: La Paz (LSUMZ 101317). *Asthenes baeri*: Bolivia: Santa Cruz (LSUMZ 153909). *Asthenes dorbignyi*: Bolivia: La Paz (LSUMZ 101323). *Thripophaga fusciceps*: Bolivia: Beni (bill; LSUMZ 124064). *Phacellodomus sibilatrix*: Bolivia: Santa Cruz (LSUMZ 153910). *Xenerpestes singularis*: Peru: San Martín (bill; LSUMZ 84692). *Metopothrix aurantiacus*: Peru:

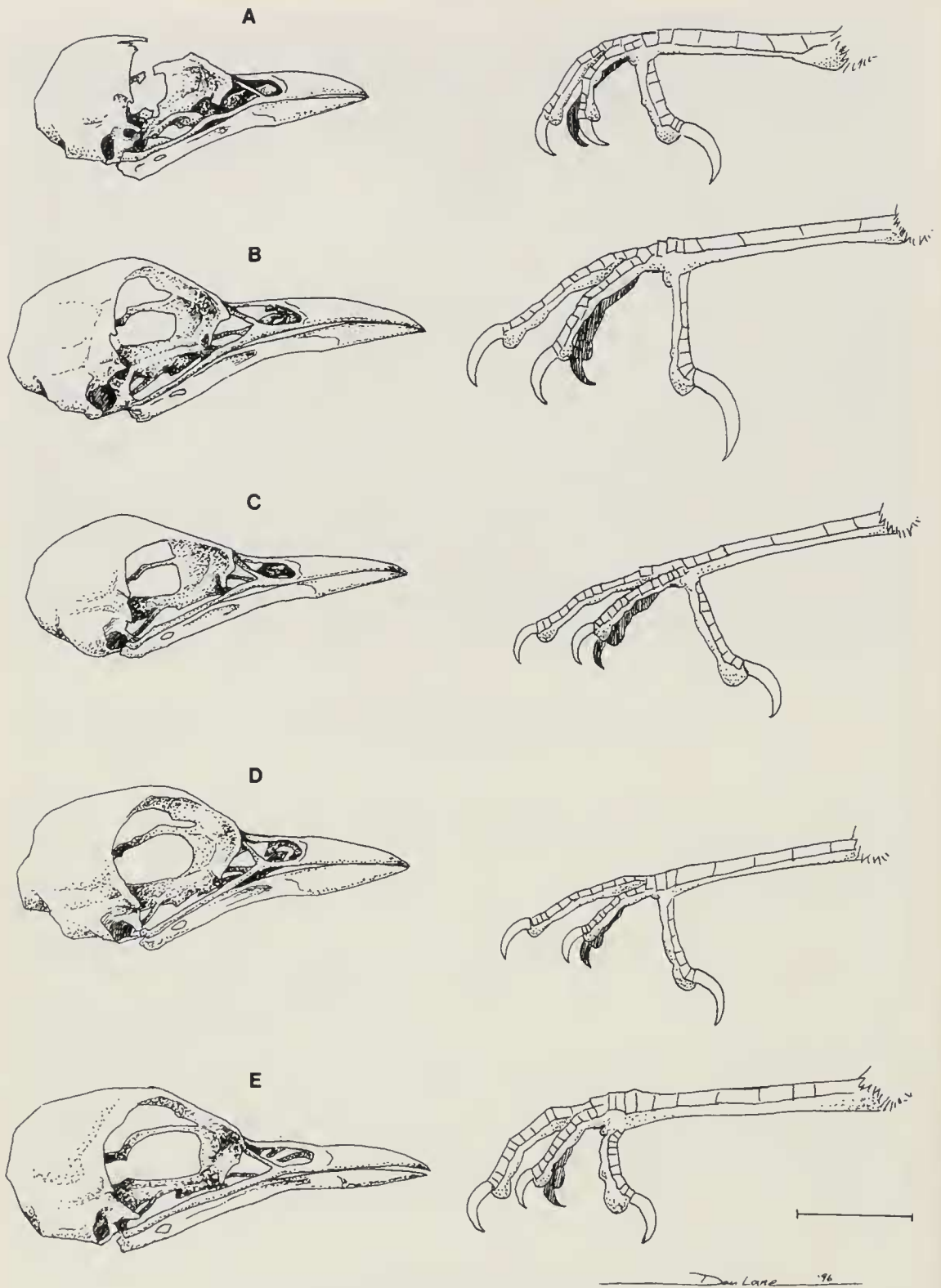


FIG. 2. Cranial and tarsal profiles of: A. *Acrobatornis fonsecai* gen. nov. sp. nov. (interorbital septum and frontal destroyed by shot); B. *Asthenes baeri*; C. *A. dorbignyi*; D. *Cranioleuca albiceps*; E. *C. pyrrhophia* to show the pseudo-schizorhinal skull of *Acrobatornis* and to permit general comparisons, especially bill shapes and relative thicknesses and lengths of tarsi, with some relevant taxa (continued).

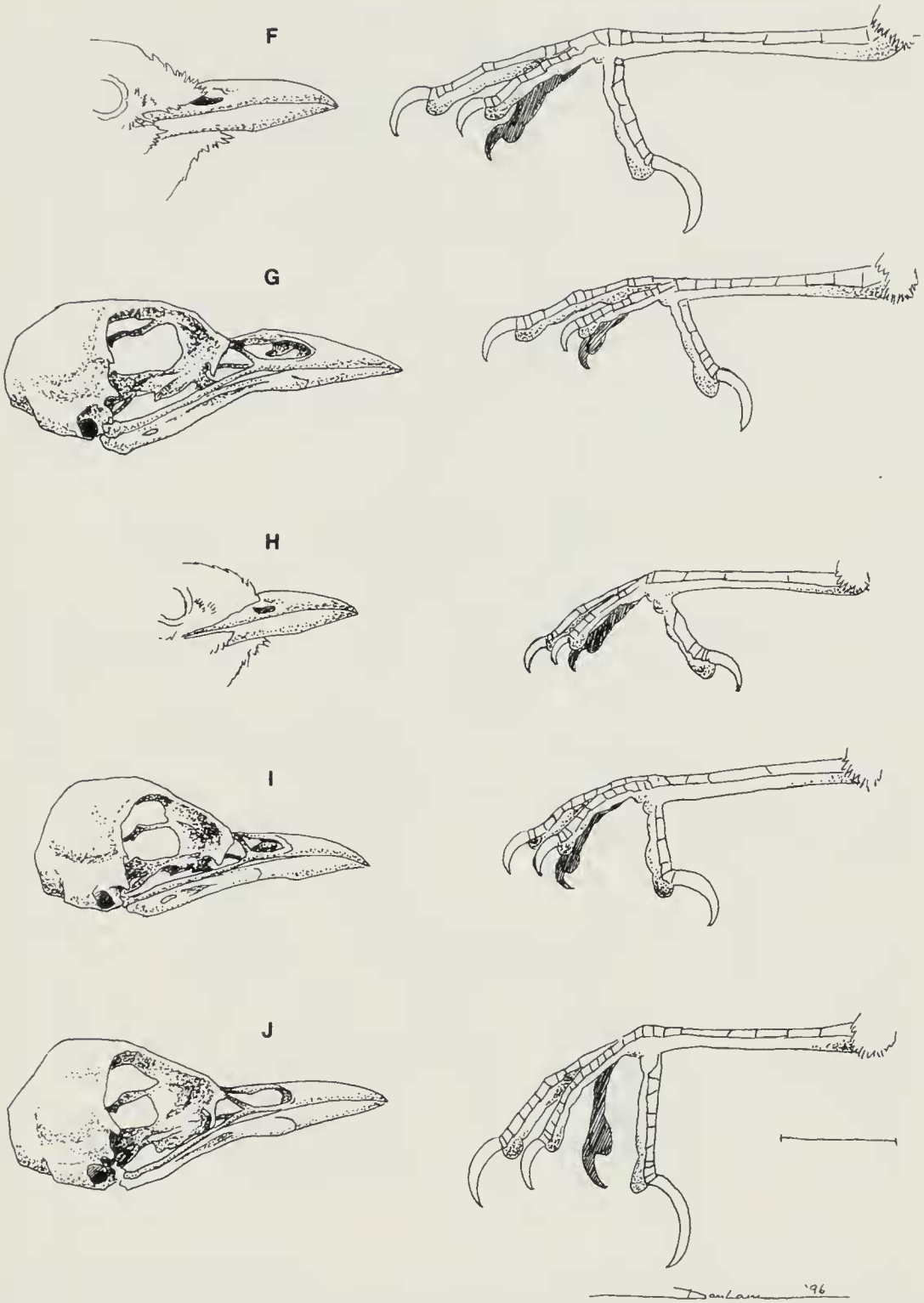


FIG. 2. (continued) Cranial and tarsal profiles of: F. *Thripophaga fusciceps* (no skull available); G. *Phacellodomus sibilatrix*; H. *Xenerpestes singularis* (no skull available); I. *Metopothrix aurantiacus*; J. *Margarornis squamiger* for comparison with *Acrobatornis fonseci* gen. nov. sp. nov. in 2A. Drawings by Dan Lane.

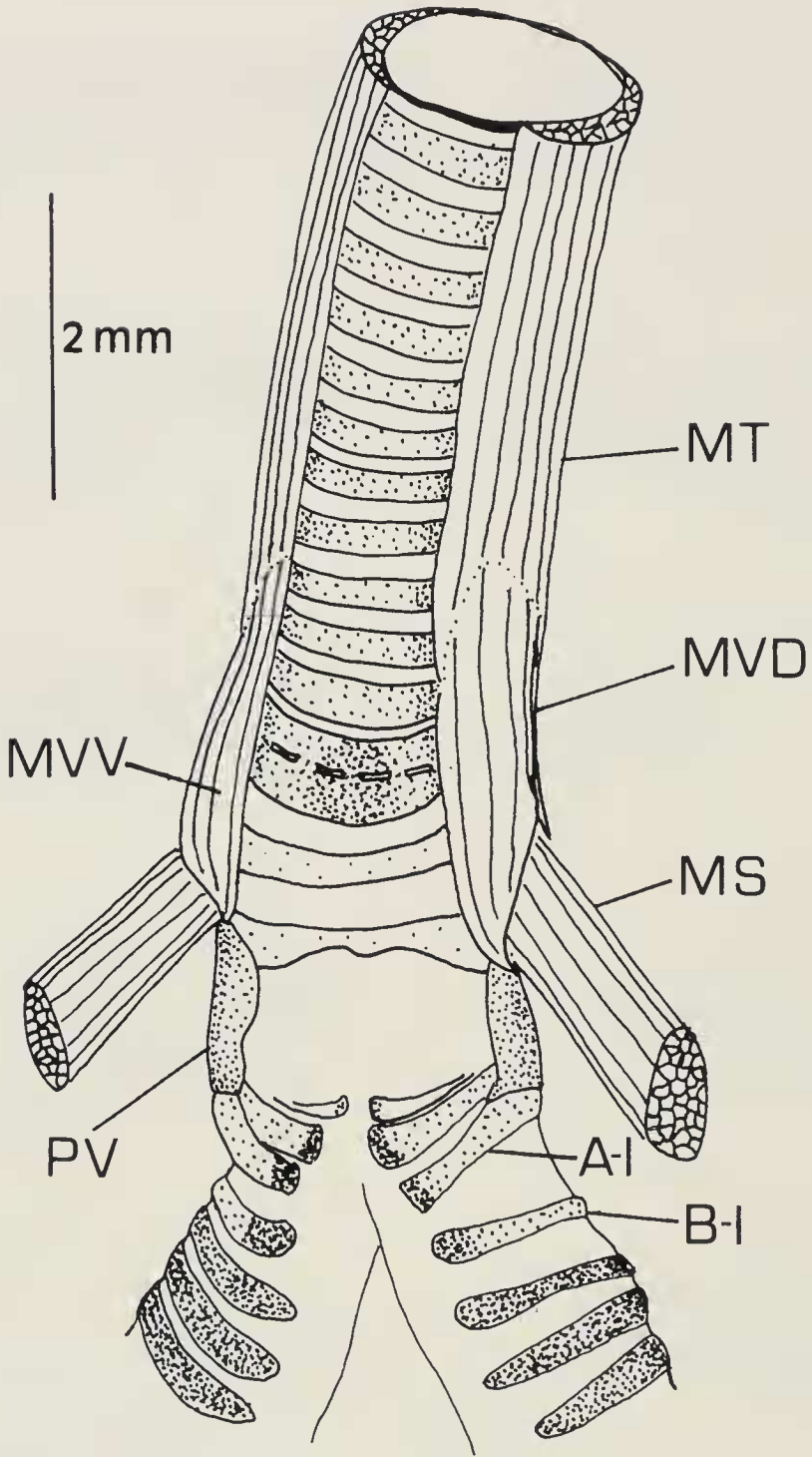


FIG. 3. Syrinx of *Acrobotornis fonsecai* gen. nov. sp. nov. showing well-defined Membranae tracheales and two pairs of intrinsic syringeal muscles, features that place it in the Furnarioidea. The lack of "horns" on the Processi vocales (PV) unequivocally places the new genus in the Furnariidae (as opposed to the Dendrocolaptidae). MT = M. tracheolateralis; MVD = M. vocalis dorsalis; MVV = M. vocalis ventralis; MS = M. sternotrachealis; PV = Processus vocalis; A-I and B-I = cartilaginous elements. Nomenclature follows Ames (1971). Drawing by Gonzaga.

Loreto (LSUMZ 51912). *Margarornis squamiger*: Peru: Pasco (LSUMZ 129867). *Syrinx*: *Acrobatornis fonsecai*: Brazil: Bahia (from holotype).

SPECIMENS EXAMINED: TAPE-RECORDINGS.—The voices of all but about 20 species of furnariids were included in initial comparisons with the vocalizations of *Acrobatornis* gen. nov. sp. nov. Selected recordings from which sound spectrograms were made are listed, with pertinent data, in the figure legends. All recordings will be archived at the Library of Natural Sounds (hereafter LNS), Cornell Laboratory of Ornithology, Ithaca, New York, and those made in Brazil, also at the Arquivo Sonoro Elias P. Coelho (ASEC), Universidade Federal do Rio de Janeiro, Rio de Janeiro.

BIOCHEMICAL SPECIMENS.—All biochemical specimens stored at LSUMZ, with the following tissue collection catalog numbers: B-26329 (voucher MZUSP 74154, holotype; male; blood); B-26330 (voucher MZUSP 74155; female; blood and liver in separate tubes); B-26331 (voucher MPEG 52345; male; blood and liver in separate tubes).

ETYMOLOGY.—From the Greek words *akróbatos*, and *órnis*, referring to the acrobatic climbing and hanging foraging behavior of this bird; the root *akróbatos* is immediately understood in a remarkably diverse set of languages. The name is masculine in gender.

Acrobatornis fonsecai sp. nov.

Pink-legged Graveteiro

Acrobata (Portuguese)

HOLOTYPE.—MZUSP No. 74154; adult male from 15°11'S, 39°23'W, at approximately 550m elevation in the serra das Lontras above Itatingui, Municipality of Arataca, Bahia, Brazil; 25 January 1995; collected by J. F. Pacheco, prepared by L. P. Gonzaga. Blood sample housed at LSUMZ, No. B-26329. Not tape-recorded.

DISTRIBUTION.—Apparently restricted to the region of southeastern Bahia between the drainage of the Rio de Contas in the north (known to just north of Ibirataia, 14°02'S, 39°40'W) and the Rio Jequitinhonha in the south (southernmost record near Teixeira do Progresso, approximately 15°45'S, 39°28'W), occurring west at least as far as Ipiaú (14°06'S, 39°42'W) and east as far as the vicinity of Itabuna (14°48'S, 39°17'W) (Fig. 4). Altitudinal distribution from near sea-level to approximately 550 m.

DESCRIPTION OF HOLOTYPE.—The two descriptive colors, “medium-gray” and “dark-gray,” correspond to Munsell® Soil Color Chart (1994 ed.) 7.5YR 5/1 and 7.5YR 4/1, respectively. Crown black. Frontal and loreal feathers (which are normal, not elongated or stiffened), posteriorly to approximately the anterior edges of the orbits, medium-gray with black apical margins imparting a grizzled appearance to these regions. Tiny feathers of malar and suborbital regions margined blackish more narrowly than the frontal feathers. Superciliary stripes subtly whiter, about 2.5 mm wide and 10 mm long posterior to orbit, blending into medium-gray of sides of neck. Post-ocular stripes (about 3.5 mm wide and 10 mm long) blackish and surrounded by medium-gray of headside. Nuchal and mantle feathers dark-gray with conspicuous blackish margins, imparting a weakly scalloped effect. Small, anteriormost scapular feathers largely blackish; larger, posterior ones wholly dark-gray. Middle back posteriorly through rump and upper tail coverts pure-medium-gray. Underparts from chin to belly same medium-gray as headside, but appearing narrowly streaked (or mottled, on throat) with white, widest on lower breast, owing to white feather shafts and margins of these feathers. Medium-gray of flanks and undertail coverts very weakly tinged olivaceous, and streaking in these regions obsolete. Tail and wing in molt. Rectrices dark-gray, blackish at tips, lighter overall on undersurface; shafts blackish dorsally and whitish ventrally. Outermost rectrices with narrow but conspicuous whitish fringes on inner webs. Feathers at wrist whitish flecked with medium-gray. Alula and upper primary coverts black,

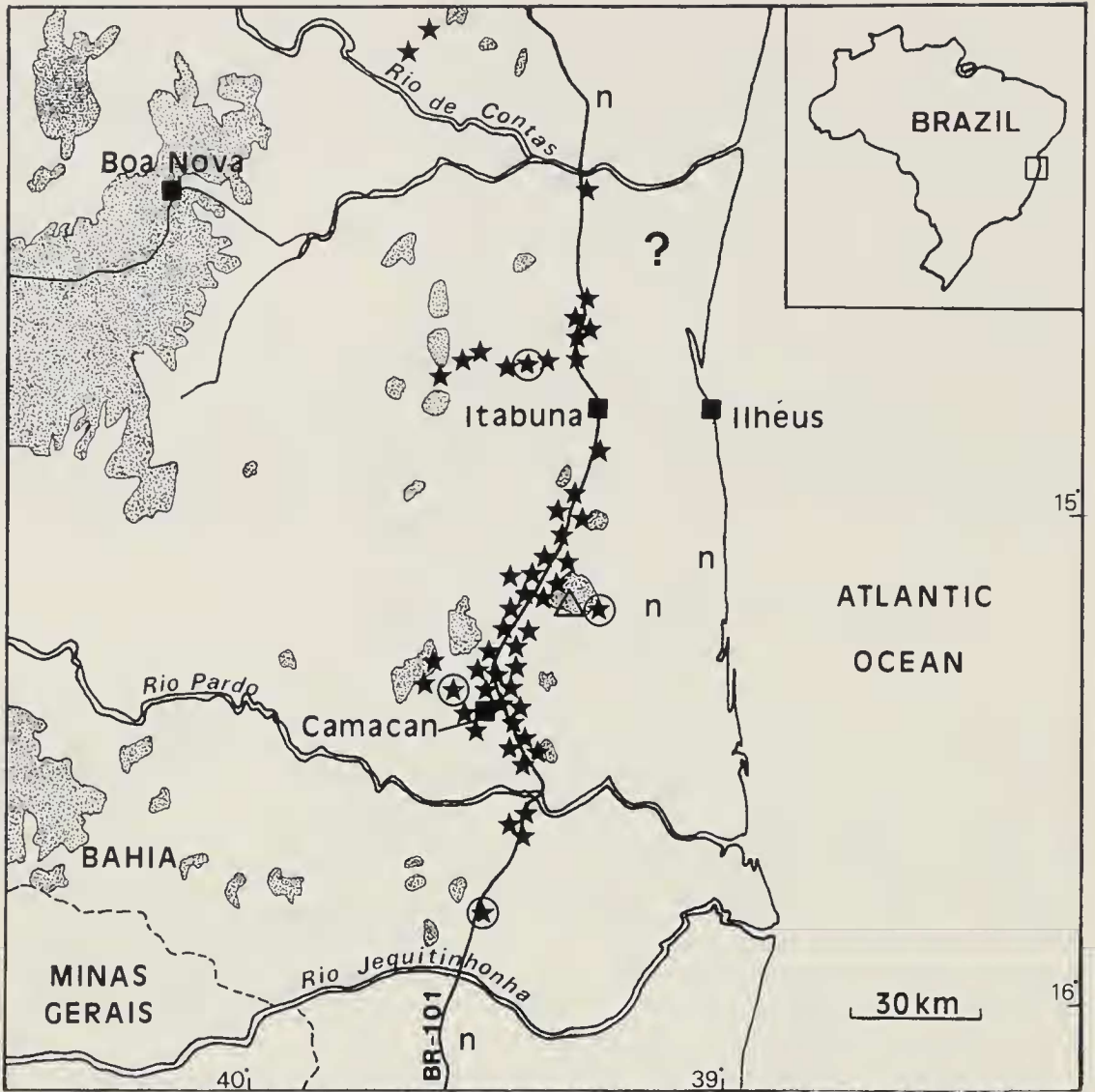


FIG. 4. Distribution of *Acrobatormis fonsecai* in southeastern Bahia, Brazil, showing principal rivers, cities, and the major highway BR-101. Triangle is the type locality in the serra das Lontras. Stars indicate trees with nests; a few sites very close together were mapped as a single point. Circled stars mark nests confirmed active in October 1995. The roughly linear distribution of stars reflects the fact that we conducted searches mostly from roadsides. "n" marks areas we searched for nests but found none. The single "?" is in a region we suspect holds *Acrobatormis* but which we were unable to check. Shaded areas are above 500 m elevation. Dotted line is the Bahia/Minas Gerais state boundary. We expect *Acrobatormis* occurs locally as far west as about 40°W, which is approximately the western limit of cocoa cultivation in this region.

forming a conspicuous, diagonally oriented slash along bend of folded wing; the other upper wing coverts black with light-gray or whitish borders producing, in effect, a gray-edged panel in the wing-covert region. Remiges blackish, narrowly margined (except two outermost pairs) light-gray on the proximal portion of outer webs (these margins widest where remiges meet the wing-coverts), and whitish on proximal one-half to two-thirds of inner

webs. Secondaries and tertials slightly paler than primaries, and similarly pale-fringed on outer webs; some worn feathers in this region, including at least one probable juvenal scapular feather with a brownish tinge. Soft parts in life: irides pale-gray; maxilla dark-brown; mandible pink; tarsi and feet clear, bright-pink; claws brownish-pink.

MEASUREMENTS OF HOLOTYPE (mm).—Wing (chord) 65.1; tail 56.0; culmen from base (at skull) 11.2; culmen from anterior edge nares 7.5; bill depth at anterior edge nares 3.6; bill width at anterior edge nares 3.0; tarsus 17.3; mass 15 gr.

DESCRIPTION OF FEMALE.—The single known female (MZUSP No. 74155) is like the holotype except mantle with almost no black, instead being concolor with the medium-gray back and rump. Wing with tips of primaries broken; tail 52.3; culmen from base (at skull) 11.6; culmen from anterior edge nares 7.5; bill depth not measurable; bill width at anterior edge nares 2.9; tarsus 17.2; mass unknown.

DESCRIPTION OF JUVENILE.—There are two specimens, both unsexed, quite similar in plumage, and patterned basically like the adults, but with gray regions instead largely reddish-yellow; MZUSP No. 74156 is described here. Frontal and supraloral feathers reddish-yellow (nearest 7.5YR 6/8; slightly orange than Tawny, Color No. 38, of Smithe [1975]), a few, irregularly scattered ones, posteriorly to about the posterior edge of orbits, with conspicuous black tips or with thin black margins (possibly not juvenal feathers?). Crown feathers in orbital region slightly paler reddish-yellow, the pale shafts of which overlay darker, rather worn, brownish (7.5YR 4/2) feathers, producing a subtly streaked or mottled effect. Posterior half of crown more completely brownish, carrying a weak tinge of forecrown color. Superciliary stripes blending posteriorly into subtly darker sides of neck and nearly complete nuchal collar. Post-ocular stripes (perhaps extending anteriorly through loral region) slightly paler than crown, weakly contrasting with rather grizzled headsides. Mantle and scapulars pale-brownish (7.5YR 5/2), most washed with reddish-yellow, distinctly paler than crown, and with two or three medium-gray (7.5YR 5/1) feathers (probably not juvenal) in the anterior region. Rump and upper tail coverts rather bright yellowish-red (5YR 5/8). Underparts generally same reddish-yellow as sides of neck, but with a blotchy appearance owing to differences in color saturation of individual feathers (effects of wear?), grayish feather bases showing on some feathers, and small, pale, subapical spots on most throat feathers. There are also a few wholly gray feathers (probably not juvenal) on the side of the breast. Most rectrices are abraded at tips; central pairs slightly narrower than adult and not excised. The outermost three pairs largely orange-rufous (nearest 2.5YR 5/8), with this color concentrated on outer web. Dark-gray (7.5YR 4/1) bases present on all rectrices, increasing in extent from outermost to innermost such that three innermost pairs have largely dark proximal webs. Wing patterned as in adult (black regions same), but all gray feather margins instead yellowish-red (5YR 5/8). Secondaries and tertials with wider, more conspicuous margins, and primaries with thin, yellowish-red apical fringes instead of solidly blackish. Soft parts as in adults, with pale-grayish irides. Wing (chord) 61.1; tail 56.1; culmen from base (at skull) 11.3; culmen from anterior edge nares 7.2; bill depth not measurable; bill width at anterior edge nares 3.0; tarsus 17.3; mass 14 gr.

ETYMOLOGY.—We are pleased to name this distinctive new furnariid for Paulo Sérgio Moreira da Fonseca (“P.S.”) of Rio de Janeiro, our multi-talented friend of many years, not only because he was the first to gasp in wonder at the living bird, but also in recognition of his unending encouragement and deep generosity. Through his excellence in the identification and observation of birds, P.S. has contributed much valuable data to our continuing studies of the Brazilian avifauna.

We designate the English name Pink-legged Graveteiro to call attention to conspicuous morphological and ecological features of the bird: the stout, bright-pink legs and feet, and the fact that it gathers twigs and sticks (“gravetos” in Portuguese) to construct its nest, as

do several other groups of furnariids, such as the canasteros (“basket-makers” in Spanish). Indeed, to call *Acrobatornis* a “canastero” or “thornbird” or “spinetail” or any other existing English name seems inappropriate, regardless of its phylogenetic affinities.

The Portuguese name *Acrobata* refers to the highly acrobatic foraging behavior of the new species, and this is the name we became accustomed to use while studying it in the field.

REMARKS

Variation in the type series.—The type series comprises four adults and two specimens in largely juvenal plumage. The adult specimens, aside from the holotype and the female described above, are an adult male (MPEG No. 52345), and an unsexed bird (LSUMZ No. 160000), both of which are virtually like the holotype except that they have considerably less black feather-edging in the mantle region, more closely approaching the adult female than the holotype. The second juvenile specimen, MPEG No. 52346, is very much like MZUSP No. 74156, but with all orangish feathers slightly paler, and with the lower back and rump largely medium-gray. This specimen weighed only 12 g.

Habitat.—Mori (1989) summarized specific climatic data from the lowland “moist forest” of southeastern Bahia, and characterized the region as generally hot and humid, without a distinct dry season (but with short, unpredictable dry periods of one to three months), and with rainfall greater than 1300 mm/year. *Acrobatornis fonsecai* inhabits the canopy and subcanopy in a restricted section (Fig. 4) of the moist Atlantic Forest domain of southeastern Bahia, hereafter referred to as the Itabuna-Camacan region. Native forest within its known range, where not removed altogether, has been converted to cocoa (*Theobroma cacao*) plantations virtually completely; we found no intact forest habitat below about 400 m elevation and almost none below 600 m. Traditionally, cocoa is cultivated by thorough removal of the native forest understory, and thinning of the canopy to about 25 trees/hectare to provide the necessary shade for the growing cocoa, a system known as “cabruca” (Mori et al. 1983). Within the known range of *Acrobatornis*, cocoa is cultivated to elevations of about 600 m (pers. observ.); indeed, there is little land above this elevation. We found *Acrobatornis fonsecai* only in canopy trees left to shade cocoa plantations (Fig. 5).

When first discovered at 550 m in the serra das Lontras (which turned out to be the highest elevation at which we ever found it), we expected that *Acrobatornis* was a montane forest species, like other undescribed forms recently discovered in southern Bahia. It soon became apparent, however, that *Acrobatornis* was absent from undisturbed montane forest and, at these higher elevations, was to be found only in the tall trees shading cocoa, beyond the forest edge. Following our October field ex-



FIG. 5. Habitat of *Acrobatornis fONSECAI* gen. nov. sp. nov. *Leguminosae* and other trees (thinned, “cabruca” canopy) shading cocoa monoculture at the type locality in the serra das Lontras of southeastern Bahia, Brazil. Three nests of *Acrobatornis* are visible in the canopy of the thin tree right of center (two nests above the horizon, one below). Photo by Whitney.

pedition, all evidence indicates that *Acrobatornis* has spread from a narrow distributional center in the contiguous lowlands into the higher elevations of the serra das Lontras and serra Bonita, exactly following the opening of these denser, more humid, montane canopies for the propagation of cocoa.

The broken, cabruca canopies in the Itabuna-Camacan region, and the continuous canopies of undisturbed forests above about 500 m, have many trees heavily laden with bromeliads, lianas, orchids, and mosses. We also noted many species and individuals of *Leguminosae* (e.g., *Ery-*

thrina verna, *Senna multijuga*, *Schizolobium parahyba*, *Inga* spp.), the small leaves and relatively open canopies of which allow much greater penetration of sunlight and wind and, consequently, support almost no epiphytic growth. *Acrobatornis* favors Leguminosae for nesting (Whitney et al. 1996). Other species of Leguminosae listed by Lewis (1987) as common in the cocoa-growing region of southern Bahia are *Diploptropis incexis*, *Platycyamus regnellii*, *Sweetia fruticosa*, *Parkia pendula*, and *Plathymenia foliolosa*. In late January, *Acrobatornis* also foraged in large, flowering, *Croton* sp. trees (Euphorbiaceae; see frontispiece).

The native habitats of the Itabuna-Camacan region have suffered extensive alteration for so long that it is now difficult, perhaps impossible, to reconstruct the natural habitats there beyond a basic structural description. What is clear is that *Acrobatornis* has been able to tolerate radical changes in the habitat in which it evolved, in both a paleoclimatic time-frame, over probably millions of years, and a recent-historical context, over the past century or so. Today, *Acrobatornis* persists as a fairly common species along roads, including even the major Brazilian highway, BR-101 (we have even observed it flying across this thoroughfare), and forages and nests in close proximity to human presence (see Fig. 10 in "Conservation," below).

We suspect that *Acrobatornis* is absent from coastal forests east and south of Itabuna, where recent, pluviomarine soils (RADAMBRASIL 1981; see discussion under "Origins" below) and forest structure (pers. observ., unquantified) differ from those in the Itabuna-Camacan region. We failed to find *Acrobatornis* along the principal roads from just east of Arataca east to Una (practically on the coast), then north along the coast to near Ilheus. Indeed, we noted few cocoa plantations east of the vicinity of Arataca (which might reflect the different soil type?). We did not conduct tape-playback presentations to attempt to find birds, but base the above suggestion on the fact that we noted no nests of *Acrobatornis* (see below). *Acrobatornis* might occur somewhat farther east, to the north of Ilheus, where soils and cocoa plantations quite near the coast are apparently much like those in the Itabuna-Camacan region; we did not have an opportunity to explore this area (see "?" in Fig. 4). We expect it occurs west to about 40°W, which is near the western limit of cocoa cultivation in this region.

Breeding.—As appears to be true of most species of passerines in the Atlantic Forest (pers. observ.), *Acrobatornis* breeds in the September/October, spring period, at least. Two adults collected in early October appeared to be in breeding condition and, at this season, the birds were singing conspicuously and feeding both nestlings and fledged, food-begging juveniles. On 4 October 1995, when we were actively looking for

potential nests of the new species, it was the food-begging calls of nestling *Acrobatornis* that first called our attention to an unusually sized and shaped stick-nest in the canopy of a leafy *Erythrina* tree. Nests were characteristic, often conspicuous masses of sticks and twigs in the canopies of tall trees, easily seen from roadsides. We confirmed that the presence of nests was a highly reliable indicator of the presence of *Acrobatornis*, as previously undetected birds responded within 1 min to playback of tape-recordings presented below nests. The nest and nesting ecology of *Acrobatornis fousecai*, and implications for intrafamilial relationships, were described by Whitney et al. (1996).

We observed adult *Acrobatornis* feeding young in four nests at widely scattered localities (Fig. 4). At one active nest, we determined that both adults feed the young, although they usually were not at the nest simultaneously. Feeding intervals between 08:30 and 11:00 averaged about once every 10 min., with more regular feedings earlier in the period. Feeding intervals probably vary considerably with the age of the young; noisiness of the young in this nest suggested that they were fairly well-developed. We also noted that adults (perhaps only the male?) usually sang once from near the nest entrance immediately after feeding the young. At another active nest in which no young birds were audible, we suspect that the adult (presumed female, as the presumed male was singing some 50 m away at the time) was incubating or brooding small young, because it once stayed inside the nest for 13 mins. We suspect that the clutch size is two or three, because we saw pairs of adults accompanied by two young birds several times and, on two occasions, by three presumed offspring (one of which could have been from a previous nesting). Gonads of the two adult specimens collected in late January were largely destroyed by shot (one could not be sexed), such that reproductive condition was not possible to determine, but Pacheco, Fonseca, and Bauer noted that *Acrobatornis* was not vocal and was generally inconspicuous then. Similarly, Whitney noted relatively poor response to tape playback in early March, and presumed young birds in the company of adults were not food-begging.

Molt.—Of the two (adult) specimens of *Acrobatornis* collected in early October, during the breeding season, one (female) showed no sign of molt, and one (male) was molting the inner primaries; tail molt had not commenced. The two adults collected in late January had little evidence of molt in the head and body. One (male; holotype) was molting primary No. 7 and molt of the rectrices was well underway. It had retained at least one brownish-tinged scapular feather on the left side. The other specimen (unsexed) was molting some primaries but no rectrices. Juvenal plumage is apparently replaced in the postjuvenal molt. Both juveniles

collected in late January showed at least one ingrowing, adult-colored rectrix and several black or gray head and body feathers. If these birds were fledged in the previous breeding season, definitive feathering is probably attained by about six months age. Although we have no firm evidence that *Acrobatornis* has a distinct subadult plumage (one ingrowing rectrix with a rufous margin on the right side of MZUSP No. 74156 seems different from adult), as do *Scytalopus* tapaculos, for instance, this merits further attention.

Behavior and ecology.—*Acrobatornis fonsecai* foraged in the canopy and subcanopy of tall trees, virtually always in the company of mixed-species flocks of small insectivores and frugivores. Consistent flock associates in cocoa plantations were Gray Elaenia (*Myiopagis caniceps*), Chestnut-crowned Becard (*Pachyramphus castaneus*), Black-capped Becard (*P. marginatus*), Streaked Xenops (*Xenops rutilans*), Rufous-browed Peppershrike (*Cyclarhis gujanensis*), Red-eyed Vireo (*Vireo olivaceus*); Tropical Parula (*Parula pitiayumi*), Bananaquit (*Coereba flaveola*), Flame-crested Tanager (*Tachyphonus cristatus*), Sayaca Tanager (*Thraupis sayaca*), Palm Tanager (*T. palmarum*), Violaceous Euphonia (*Euphonia violacea*), Chestnut-bellied Euphonia (*E. pectoralis*), Green-headed Tanager (*Tangara seledon*), Red-necked Tanager (*T. cyanocephala*), and Blue Dacnis (*Dacnis cayana*). At higher elevations, Rufous-headed Tanager (*Hemithraupis ruficapilla*) was a near-constant member of mixed-species flocks, and a variety of other species occasionally joined near undisturbed forest borders. At about 550 m in the serra das Lontras, *Cranioleuca pallida* (Pallid Spinetail) foraged in some of the same mixed-species flocks as *Acrobatornis*, generally keeping to lower heights and in more tangled vegetation, performing gleans and short reaches in vines and dead leaves, but also gleaning from bark.

Acrobatornis traveled through the treetops with a variety of acrobatic maneuvers, seldom spending more than about 10 sec. at a foraging site. The birds also flew strongly, adults sometimes traversing more than 300 m in a single flight to join mixed-species foraging flocks after feeding young at the nest. The most characteristic foraging maneuvers were inverted hangs and inverted creeping or hitching along limbs (ranging in diameter from about 3 mm to 8 cm), with the tail parallel to the substrate; we estimated these behaviors constituted at least 80% of search maneuvers (terminology follows Remsen and Robinson 1990). Most other searches were scansorial along the uppersides of limbs. Individuals crawled with agility over and through the terminal leaf- and flower-clusters of tall trees, hanging and swinging as they poked their heads into the foliage. Their powerful legs and feet (Fig. 2A) allowed them to perform these maneuvers without fluttering the wings for balance. Unfortunately,

we were not able to determine the precise orientation of the legs and feet during scansorial locomotion, but some of these behaviors were video-taped, and might show sufficient detail to be informative in future study. Almost all attack maneuvers were near-perch, mostly gleaned in live foliage and flowers, and probes in moss coating trunks and limbs and the bark of dead limbs. They also reached into new, unopened (still curled) leaves, probing deeply with the bill. On only one occasion did we note dead-leaf searching. An adult *Acrobatornis* hitched along terminal branchlets to reach a small cluster of dead leaves, then poked and probed in these for several seconds. Most of the trees in which *Acrobatornis* foraged (Leguminosae) did not hold dead leaves or leaf-clusters, and their tall canopies trapped few dead leaves fallen from other trees.

On two occasions (one of which was partially video-taped) we observed *Acrobatornis* hitching upwards for distances of about 1 m on the principal trunks of trees at least 25 cm in diameter at foraging height (about 20 m above ground), using the tail as a brace or prop (a behavior rarely reported in Furnariidae), and probing intently in moss and at the bases of small epiphytic ferns and a bromeliad (spending nearly 3 min at this latter site). In general, trees in which *Acrobatornis* foraged held (apart from thin patches of moss) almost no epiphytic growth.

On the afternoon of 11 October, following a brief but hard rain, we observed a family group of *Acrobatornis* foraging in the mostly leafless canopy of a tree at least 35 m tall. One adult performed two aerial, fly-catching maneuvers to capture large, winged termites. It flew about 3 m upwards from the crown of the tree, stalled as it took the insect in the bill, then fluttered back to land near the other birds. Each time, a food-begging juvenile followed the adult after it landed, but was not fed. Instead, the adult bounded away quickly through the branches, and once we were able to see it hold the termite with its foot as it pecked it against the limb and swallowed it.

Apparently, most prey were very small; the only items we were able to see clearly in the field were the winged termites, several small caterpillars (fed to nestlings and food-begging juveniles), and a fairly large moth (gleaned from a dead limb) that fluttered in the bird's grasp for several seconds before being subdued and swallowed. Stomachs of three specimens collected in January contained remains of tiny arthropods. These were principally Coleoptera (including several Curculionidae and one Staphylinidae), which were present in all stomachs and represented 58% of all (N = 90) identifiable food items. Ants and insect larvae (including caterpillars) were also present in all stomachs, but the first totaled only 11% and the latter only 7% of the items. Other insects included winged Hymenoptera (including a minute apoid), Hemiptera, and Ho-

moptera (including two nymphs). Insect eggs, oothecae of an orthopteroid, and spiders were also found, each in only one of the stomachs examined.

Singing posture was nearly vertical, with the bill parallel to the ground and opened fairly widely. Sometimes, as the birds sang, they leaned forward and swung the head and neck from side to side, broadcasting the song more widely. In response to tape playback of songs in October, individuals (often just the presumed male) usually responded almost immediately by flying in to perch in the tree nearest the tape recorder. They perched in an upright posture and remained silent for up to several minutes. They then either sang one song before departing or, most frequently, flew off to rejoin the female and sang once from there. With repeated tape playbacks, males twice descended to near the ground, and females and immatures sometimes came to trees overhead.

Vocalizations.—The vocal repertoire of *Acrobatornis fonsecai* is typical of that of most furnariids (pers. observ.). Whitney recorded 29 songs (at least 19 of which were in response to playback) from 12–14 individual adult *Acrobatornis*, and other vocalizations from several (number undetermined) individuals, four of which were immatures or juveniles. The natural (unsolicited) song may be generally characterized as a simple series of very short, piercing syllables at about 5.5 kHz that begins with syllables delivered slowly enough to be counted (5–8/sec), then gradually accelerates in pace while decreasing slightly in amplitude, finishing with syllables spaced tightly. It is almost always introduced by 2–4 more irregularly spaced, sharp syllables, and lasts from about 4–8 sec (Fig. 6A, B, C). Some parameters of songs vary slightly, mostly with respect to overall duration. The shortest songs always begin as described above, but then do not achieve a delivery rate greater than about 15 syllables/sec. Longer songs, and those given in response to playback, finish with syllables delivered at a rate of 20–26/sec, and the series tends to drop approximately 0.5 kHz in frequency as it loses amplitude (Fig. 6B, C). Songs given in response to playback may be nearly 12 sec in duration and usually have a few stutters in the fastest section, after the halfway point (Fig. 6C). Songs are audible to at least 200 m. *Acrobatornis* produces a duet in which the two members of the pair sing different parts. The presumed male sings a normal version of the song and the female joins in with irregularly paced bursts of sharp chips much like the introductory syllables of songs (Fig. 6D). Few duets were heard, and these were in response to tape playback.

Calls given by foraging *Acrobatornis* are short, sharp, single syllables delivered at irregular intervals; flight calls are similar. Food-begging juveniles utter a slightly higher-sounding version of this call and sometimes

give doublets with the two elements about 0.17 sec apart and the first slightly louder (adult and juv. calls Fig. 6E). Also given by adults, although rather rarely (heard only twice), is a chattering vocalization that may be a pair greeting. It is delivered when one member of a pair that has been foraging apart flies in to land near its mate. It may be described as a jumble of 10–12 syllables, quietest in the middle, then loudest through the final three or four syllables, which are more distinctly separated from each other (Fig. 6F). Complete songs are sometimes delivered immediately following this vocalization. We did not hear the scolding or mobbing vocalization of *Acrobatornis*.

SYSTEMATIC RELATIONSHIPS, ORIGIN, AND DESTINY

Phylogeny and classification of the Dendrocolaptidae/Furnariidae complex, or of its many subgroups, have been the subjects of some important recent studies (Vaurie 1971, 1980; Feduccia 1973; Sibley and Ahlquist 1985; Rudge and Raikow 1992a,b; Clench 1995), all of which, however, have focused on morphological comparison with limited or inconsistent discussion of other characters. Vaurie (1980) focused especially on nest location and architecture. Owing to the variety of taxa judged “intermediate” in one or another kind of analysis, and the fact that many species and several genera have not been included in most of these analyses, even familial limits remain the subject of considerable debate. Detailed documentation of a new genus, then, especially one well-differentiated from all others and perhaps basal to some contemporary groups, seems particularly desirable. Placement of the new genus in the Furnariidae requires comparison to several other, possibly related genera. Much further analysis, incorporating morphological, vocal, ecological, and biochemical data (a great deal of which are now available) is needed to construct a well-corroborated phylogeny of this large and complex assemblage of birds.

In Table 1 (comparative mensural data from selected furnariids), Fig. 2 (skulls and tarsi), and Figs. 6–9 (spectrograms of songs and other vocalizations; many examples from near type localities), we present comparative data for *Acrobatornis* and a variety of selected genera (and selected species of each) that we judge, from field and museum experience, to be relevant, regardless of degree of actual relatedness. These are: *Cranioleuca*, *Asthenes*, *Thripophaga*, *Phacellodomus*, *Xenerpestes*, *Metopothrix*, and *Margarornis*; aspects of each will be described and discussed relative to *Acrobatornis*. We consider each of them, except *Asthenes*, to be monophyletic as currently defined, or close enough to monophyletic (e.g., *Cranioleuca*) for the purposes of the present comparisons. Perhaps the monotypic *Siptornis* should be considered as well, but we have insufficient data (no nest, no recordings of song). Tails of these various

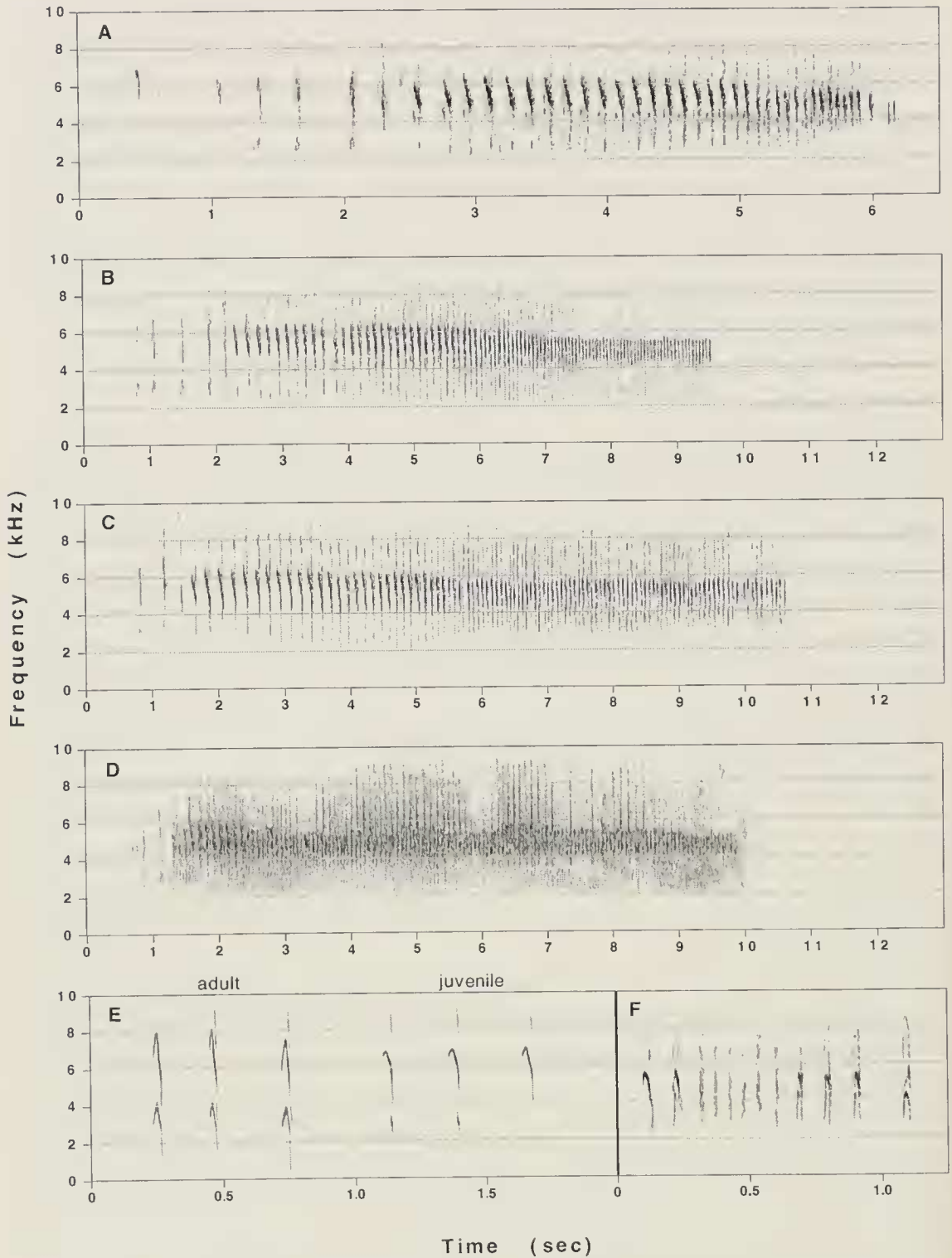


FIG. 6. Sound spectrograms of vocalizations of *Acrobotormis fonsceai* gen. nov. sp. nov. for comparison with those of other taxa shown in subsequent figures. All songs in this and subsequent figures (except A in this figure) shown on same time scale; all other vocalizations are on a scale 4× that of songs to show greater detail. A. Natural song, short version, presented on scale 2× that of other songs. Serra das Lontras, 5 Oct. 1995, 475 m. B. Natural song, long version, with more rapidly paced ending. Serra das Lontras, 8 Oct. 1995, 480 m.

genera are at least moderately graduated and composed of 12 rectrices that are somewhat stiffened, except *Thripophaga* and *Xenerpestes*, in which rectrices are soft. Most of the following discussion of these genera stems from Whitney's unpublished observations.

Cranioleuca.—Bill length varies substantially in *Cranioleuca* (e.g., Fig. 2B, C), with even the smallest-billed species (such as *C. curtata* Ash-browed Spinetail) considerably longer-billed than *Acrobatornis* (Table 1). Body mass is roughly similar (Table 1). Tail/wing ratios for the three representatives of *Cranioleuca* in Table 1 average 1.1 (and all species have the tail longer than the wing, although the *albiceps* complex has low tail/wing ratio), whereas *Acrobatornis* has the tail shorter than the wing with an average ratio of 0.89. Rectrices of almost all *Cranioleuca* species are acuminate and, in many species, the innermost are excised on the inner web near the tip, forming a point without an exposed spine. The excised tips of the rectrices of some *Cranioleuca* taxa closely approach the shape of those of *Acrobatornis*. Wings and tails of all members of *Cranioleuca* are almost entirely rufous, but many species show darker feathers in the alula region, and some have blackish proximal webs on the primary coverts. The obvious difference in color aside, none shows as marked a pattern, or the same pattern, on the wing as *Acrobatornis*, but we do see a vague similarity. Almost all species of *Cranioleuca* have pale superciliary stripes contrasting with a dark (brown or rufous, streaked in two) crown or cap; a few have dark superciliaries contrasting with buffy or white crowns. The superciliaried/capped pattern of *Cranioleuca* seems much like that of *Acrobatornis*, but this pattern is pervasive in Furnariidae. All members of *Cranioleuca*, except the marsh-inhabiting *C. sulphurifera* (Sulphur-bearded Spinetail), forage arboreally and almost exclusively with mixed-species flocks, moving through the middle strata and subcanopies (*C. albiceps* complex in understory) of forest and woodland with short hops and hitches along horizontal and vertical substrates, performing reaches and gleans from vines, bark, dead leaves, and tangles,

←

C. Song after tape playback of conspecific song, which is essentially identical to the long natural song shown in B. 7 km W Camacan, 12 Oct. 1995, 105 m. D. Duet in which one bird (adult male?) delivers a long song and is joined by the other bird giving irregularly paced bursts of similar syllables. Serra das Lontras, 7 Oct. 1995, 475 m. E. Calls: foraging/contact of adult (three on left) and food-solicitation of one accompanying juvenile (three on right). 4 km W Arataca, 11 Oct. 1995, 110 m. F. Chatter that seems to serve as a pair greeting call, and is sometimes followed immediately by the song. Same loc. and date as E. All recordings by Whitney. Sound spectrograms produced with "Canary" 1.2 of the Bioacoustics Research Program of the Cornell Laboratory of Ornithology, Ithaca, New York, and "Canvas" of Deneba Software, Miami, Florida.

TABLE 1
STANDARD MEASUREMENTS OF *ACROBATORNIS FONSECAI* AND SELECTED OTHER GENERA AND SPECIES OF FURNARIIDAE

	<i>Acrobatornis fonsecai</i>	<i>Asthenes</i>		<i>Cranioleuca</i>			<i>Thripophaga fusciceps</i>	<i>Phacellodo- mus sibilatrix</i>	<i>Xenopetes singularis</i>	<i>Metapothrix aurantiacus</i>	<i>Margaramis squamiger</i>
		<i>baeri</i>	<i>dorbignyi</i>	<i>albiceps</i>	<i>pyrrhophia</i>	<i>curtata</i>					
Bill width $\bar{x} \pm SD$ (N) range	3.0 \pm 0.05 (4) 2.9-3.0	3.0 \pm 0.38 (5) 2.6-3.6	3.0 \pm 0.13 (4) 2.9-3.2	3.2 \pm 0.06 (3) 3.2-3.3	2.8 \pm 0.21 (3) 2.6-3.0	3.3 \pm 0.29 (4) 3.0-3.7	4.1 \pm 0.10 (3) 4.0-4.2	3.3 \pm 0.33 (4) 3.0-3.8	3.2 \pm 0.18 (5) 3.0-3.4	3.2 \pm 0.06 (3) 3.1-3.2	3.1 \pm 0.15 (3) 3.0-3.3
Bill depth $\bar{x} \pm SD$ (N) range	3.6 \pm 0.07 (2) 3.5-3.6	3.5 \pm 0.24 (4) 3.4-3.9	3.7 \pm 0.26 (4) 3.5-4.0	3.9 \pm 0.10 (3) 3.8-4.0	3.4 \pm 0.06 (3) 3.4-3.5	3.7 \pm 0.26 (4) 3.5-4.1	4.7 \pm 0.15 (3) 4.5-4.8	3.9 \pm 0.14 (2) 3.8, 4.0	3.3 \pm 0.15 (5) 3.1-3.5	3.3 \pm 0.07 (2) 3.3, 3.4	3.3 \pm 0.0 (3) 3.3-3.3
Bill length from nares $\bar{x} \pm SD$ (N) range	7.4 \pm 0.16 (4) 7.2-7.5	7.6 \pm 0.48 (5) 6.9-8.1	9.9 \pm 0.25 (4) 9.6-10.2	10.2 \pm 0.15 (3) 10.0-10.3	10.5 \pm 0.55 (3) 9.9-10.9	9.5 \pm 0.88 (4) 8.9-10.8	10.0 \pm 0.17 (3) 9.9-10.2	8.5 \pm 0.61 (4) 8.1-9.4	7.7 \pm 0.57 (5) 6.8-8.3	8.1 \pm 0.20 (3) 7.9-8.3	7.9 \pm 0.10 (3) 7.8-8.0
Bill length from skull $\bar{x} \pm SD$ (N) range	11.4 \pm 0.21 (4) 11.2-11.6	12.2 \pm 0.52 (5) 11.8-13.1	15.4 \pm 0.32 (4) 15.1-15.8	13.9 \pm 0.29 (3) 14.9-15.1	16.2 \pm 0.42 (3) 15.7-16.5	15.1 \pm 1.09 (4) 14.4-16.7	15.6 \pm 0.32 (3) 15.4-16.0	13.5 \pm 0.84 (4) 12.8-14.7	11.5 \pm 0.51 (5) 10.9-12.1	11.7 \pm 0.06 (3) 11.6-11.7	13.9 \pm 0.29 (3) 13.6-14.1
Tarsus $\bar{x} \pm SD$ (N) range	17.5 \pm 0.42 (5) 17.2-18.2	19.7 \pm 1.09 (4) 18.5-21.0	24.4 \pm 0.14 (4) 24.2-24.5	20.3 \pm 0.21 (3) 20.1-20.5	19.7 \pm 1.08 (3) 18.9-20.9	18.8 \pm 0.55 (3) 18.3-19.4	21.8 \pm 0.15 (3) 21.6-21.9	18.5 \pm 0.17 (3) 18.4-18.7	15.5 \pm 0.12 (3) 15.4-15.6	15.0 \pm 0.21 (3) 14.8-15.2	20.5 \pm 0.66 (3) 20.1-21.3
Tail $\bar{x} \pm SD$ (N) range	55.4 \pm 2.10 (5) 52.3-58.0	62.9 \pm 5.58 (5) 56.5-70.4	74.6 \pm 1.91 (4) 72.2-76.2	65.2 \pm 0.87 (3) 64.5-66.5	75.6 \pm 0.42 (3) 75.3-76.1	73.4 \pm 4.33 (3) 70.2-78.3	87.4 \pm 3.75 (2) 84.8, 90.1	62.4 \pm 1.82 (4) 59.7-63.6	49.1 \pm 1.25 (4) 48.4-51.0	51.5 \pm 1.21 (3) 50.1-52.2	72.3 \pm 1.42 (3) 70.8-73.6
Wing $\bar{x} \pm SD$ (N) range	63.6 \pm 3.54 (4) 60.2-67.8	58.1 \pm 3.59 (5) 55.3-62.1	67.1 \pm 4.22 (4) 62.6-71.4	64.9 \pm 0.80 (3) 64.2-65.8	64.6 \pm 2.40 (3) 61.9-66.4	65.7 \pm 1.57 (4) 64.0-67.2	74.4 \pm 3.70 (3) 70.1-76.7	55.8 \pm 1.35 (4) 54.7-57.5	55.9 \pm 1.51 (5) 54.0-57.8	57.9 \pm 0.58 (3) 57.5-58.6	76.2 \pm 1.15 (3) 75.3-77.5
Mass $\bar{x} \pm SD$ (N) range	13.7 \pm 1.26 (4) 12.0-15.0	14.4 \pm 0.55 (3) 14.0-15.0	18.4 \pm 0.48 (4) 18.0-19.0	15.7 \pm 1.05 (3) 14.6-16.7	12.9 \pm 0.72 (3) 12.1-13.5	16.7 \pm 1.06 (2) 16.0; 17.5	25.2 \pm 1.04 (3) 24.0-25.9	15.6 \pm 0.61 (3) 14.9-16.0	11.6 \pm 0.48 (4) 11.0-12.0	11.3 \pm 0.21 (2) 11.2, 11.5	16.2 \pm 2.07 (3) 14.5-18.5

and probes in mosses and epiphytic growth. *Cranioleuca* spintails rarely hang inverted for more than 1–2 sec. There are some published reports of scansorial foraging in *Cranioleuca* (e.g., Skutch 1969, Vuilleumier note 81 in Vaurie 1980), and we have observed this behavior ourselves many times. We do not believe that any member of *Cranioleuca* is as highly scansorial, or hangs as much, as *Acrobatornis*, which we suspect is reflected in the relatively short and stout tarsus of *Acrobatornis* (compare Fig. 2A with 2D, E).

Cranioleuca shows remarkable homogeneity in vocalizations across its 18 or so members, especially the montane and far-southern species, which is most of them. These songs are short (generally less than 2 sec) series of thin, spritely, syllables on a level or slightly descending frequency (the last syllable or two almost always at lower frequency), introduced by two or three relatively loud and widely spaced syllables with subsequent syllables spaced more closely and quieter (Fig. 7A, B; two species selected from recordings of all species). *Cranioleuca* songs of this type, except for their relatively rapid beginning and truncated length, are structured much like and sound similar to the song of *Acrobatornis*. Songs of *C. gutturata* (Speckled Spintail) and the two or three members of the *C. vulpina* (Rusty-backed Spintail) complex, all principally of lowland Amazonian distribution in river-created habitats, differ distinctly from those of the other members of the genus (and from each other) and do not approach the song of *Acrobatornis*. *Cranioleuca* calls are short, sharp,

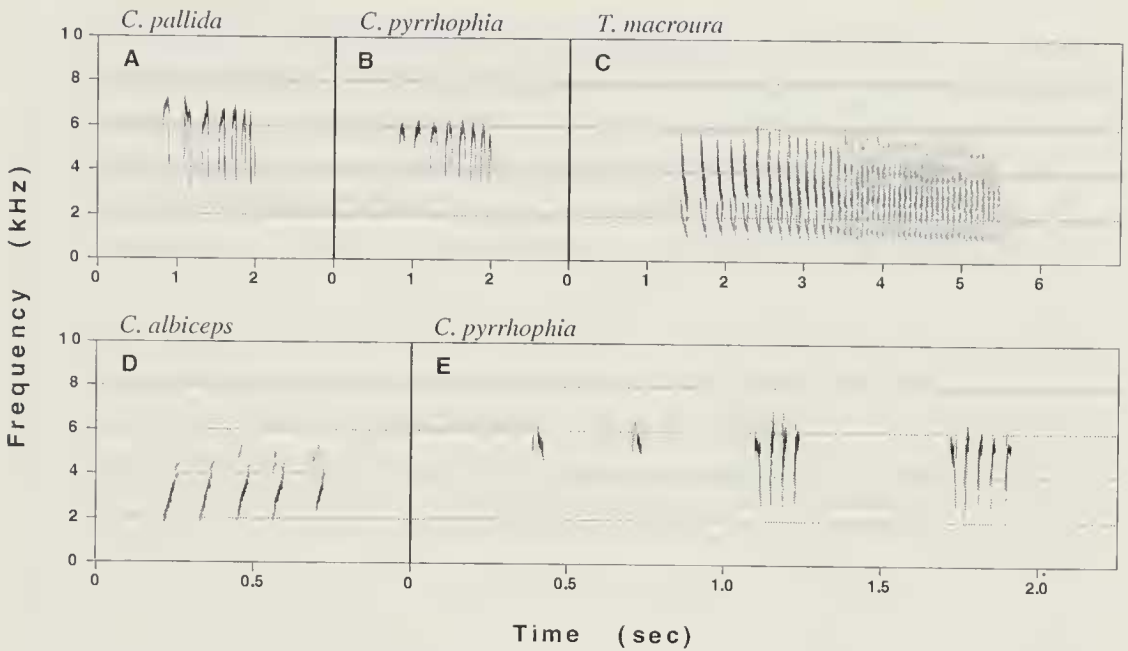


FIG. 7. Sound spectrograms of vocalizations of selected *Cranioleuca* species and *Thripophaga macroura*. A. *Cranioleuca pallida*, natural song. Brazil: Bahia, about 10 km E. Boa Nova, 8 Aug. 1993, 900 m. Recording by Gonzaga. B. *C. pyrrhophia*, natural song. Argentina: Salta, about 75 km E. J. V. Gonzalez, 30 Dec. 1987, 330 m. Close resemblance in species shown in A and B is characteristic of the montane and far-southern members of the genus (thus, most species). C. *Thripophaga macroura*, natural song. Bahia, near Almadina, 9 Oct. 1995, 425 m. D. *Cranioleuca albiceps*, scold. Bolivia: La Paz, 31 Mar. 1993, 3180 m. E. *C. pyrrhophia*, calls (two on left) and scold (two series on right). Argentina: Salta, about 60 km E. J. V. Gonzalez, 29 Dec. 1987, 330 m. LNS 43819. Scolds of most *Cranioleuca* species share this two- to six-syllable, rapidly paced structure. Foraging and pair-contact calls of most are similar as well. All recordings except A by Whitney.

single syllables (e.g., Fig. 7E [left side]) that sound much like the calls of *Acrobatornis*. Scold or mobbing vocalizations of *Cranioleuca* (we know most species) consist of 2–6 emphatic, sharp syllables (vertical orientation in spectrograms) delivered in rapid succession (e.g., Fig. 7D and E [two examples on right side]). In *Cranioleuca*, pairs rarely duet, although both members may sing simultaneously in an unsynchronized manner. As we observed for *Acrobatornis*, duets are most frequently heard in response to tape playback.

Asthenes.—To place our discussion of relationships of *Asthenes* to *Acrobatornis* in perspective, it is necessary to express our view that *Asthenes* includes two, possibly three, distinct lineages, the evolutionary histories of which have probably been independent since pre-Andean times. It serves to separate the two most obvious ones, generally, by habitat and nest architecture. The “stick-nesting” group inhabits woody brush and rocks and is not dependent on grassland (e.g., Chaco woodland and scrub;

arid and semi-arid interandean valleys; barren altiplanos; one in Brazilian serra), and builds sturdy nests of sticks (depending on their availability) lined mostly with wool and grass. The second, "grass-nesting," group is completely dependent on grassland (with or without scattered shrubs and rocks; e.g. grassy páramos; *Festuca*-dominated hillsides and valleys; one in grassy coastal marshes from extreme southern Rio Grande do Sul to Buenos Aires, Argentina) and builds nests of grasses and other herbaceous material; most species use no or few sticks (far-southern *A. anthoides* [Austral Canastero] may be an exception). A thorough definition of this division, which finds parallel in distinct morphotypes, vocalizations, and ecologies, is beyond the scope of this paper. Species limits within *Asthenes* have been the subject of much debate over the years and, unfortunately, recent modifications that seem to have gained general acceptance (e.g., the *A. dorbignyi* [Creamy-breasted Canastero] complex) have been extraordinarily poorly documented. For comparison with *Acrobatornis*, we selected some typical members of our "stick-nesting" group of *Asthenes* (see "Specimens Examined," above, Table 1, and Fig. 9).

Bill lengths and overall shapes vary considerably within stick-nesting *Asthenes*, but small-billed species like *A. baeri* (Short-billed Canastero; Fig. 2D, Table 1) and *A. patagonica* (Patagonian Canastero) closely approach *Acrobatornis*. These are also the lightest members of the group, with body mass essentially like *Acrobatornis* (data for *baeri* in Table 1). Like *Cranioleuca*, *Asthenes* have tail/wing ratios greater than 1. Stick-nesting *Asthenes* have blunt-tipped or weakly acuminate rectrices that are not excised. They forage on the ground or low in brush and rocks with short gleanings, reaches, and probes, often moving quickly between places of concealment, seldom ascending to heights of more than about 1 m except to sing or for nesting.

Two types of songs or song-like vocalizations are shared by stick-nesting *Asthenes*, each of generally uniform pattern and cadence (but a few differ appreciably in auditory quality) across the group. One begins with well-separated syllables then rapidly accelerates through several (at least 5) seconds, often descending slightly through the terminal third. Examples are shown in Fig. 8A and C (selected from recordings of all species of *Asthenes*). Figure 8E shows a variant of this song-type in which pace is much slower through about the first two-thirds, and syllables are finely modulated (and sound harsher), probably communicating a different message. In all respects, including auditory quality (which is especially difficult to judge from a spectrogram), this song-type of *Asthenes* is remarkably similar to the song of *Acrobatornis* (compare with Fig. 6A, B, C). The second song-type is a rattling series of rapidly paced syllables that begins quietly, quickly crescendos, and then trails off as it slows

down (Fig. 8B, D, F). We have not heard a song of this type from *Acrobatornis*. Among all stick-nesting *Asthenes*, the songs of *A. baeri* (of semiarid brush and woodland from extreme southern Brazil to central Argentina) and *A. dorbignyi* (of arid and semiarid, brushy valleys and slopes of the Andes of southern Peru to central Argentina) are most similar to songs of *Acrobatornis*; indeed *A. dorbignyi* and *A. baeri* appear to be sister species elevationally allopatric in the north and perhaps parapatric farther south, in Mendoza, Argentina. Like *Acrobatornis*, calls of *Asthenes* species (Fig. 8A, E, G) are sharp, single syllables similar to the introductory syllables of the song. Some canasteros occasionally sing duets, especially at territorial encounters or in response to tape-recording playback; an example is shown in Fig. 8H (*A. patagonica*).

Thripophaga.—The bill of *T. fusciceps* (Plain Softtail; Fig. 2F, Table 1) is proportioned much like that of *Acrobatornis*, but is larger; body mass is correspondingly greater as well. The rectrices of the four species currently included in *Thripophaga* are wide, soft, and blunt-tipped (the poorly known *T. berlepschi* [Russet-mantled Softtail], which probably does not belong in this genus, somewhat more pointed). We have field experience only with *T. macroura* (Striated Softtail) and *T. fusciceps* (Plain Softtail). Both forage with mixed-species flocks, mostly in the middle strata of dense, vine-rich, humid, lowland forest, by hitching and crawling upwards and laterally through tangles with the tail partially spread, reaching and gleaning (rarely hanging) from bark, vines, and especially dead foliage trapped in such places. They are not scansorial. Songs and calls of *T. macroura* and *T. fusciceps* are very similar in structure and auditory quality. A long song of *T. macroura*, selected to show maximum similarity to *Acrobatornis*, is shown in Fig. 7D; most songs are introduced by a single or two well-separated, loud syllables followed immediately by a short burst of tightly spaced syllables, the whole lasting less than about 1.5 sec. Although cadence and pace of the long song resemble the song of *Acrobatornis*, structure of individual syllables, and thus auditory quality, are quite different.

Phacellodomus.—The smallest member of *Phacellodomus*, *P. sibilatrix* (Little Thornbird), is slightly larger than *Acrobatornis* (Table 1, tail/wing ratio 1.1). Like other members of the genus, its bill is also differently shaped, with a hump above the nares and steeply sloping culmen (Fig. 2G). Rectrices of *Phacellodomus* thornbirds are blunt-tipped. They forage primarily with reaches and glean on the ground and in low brush and thickety growth, often hopping on the ground. Across the genus (we do not know *P. dorsalis* [Chestnut-backed Thornbird], of the middle Marañón valley of n. Peru), male thornbird songs are delivered from prominent perches (bush- or treetops, for instance, always near the nest) and con-

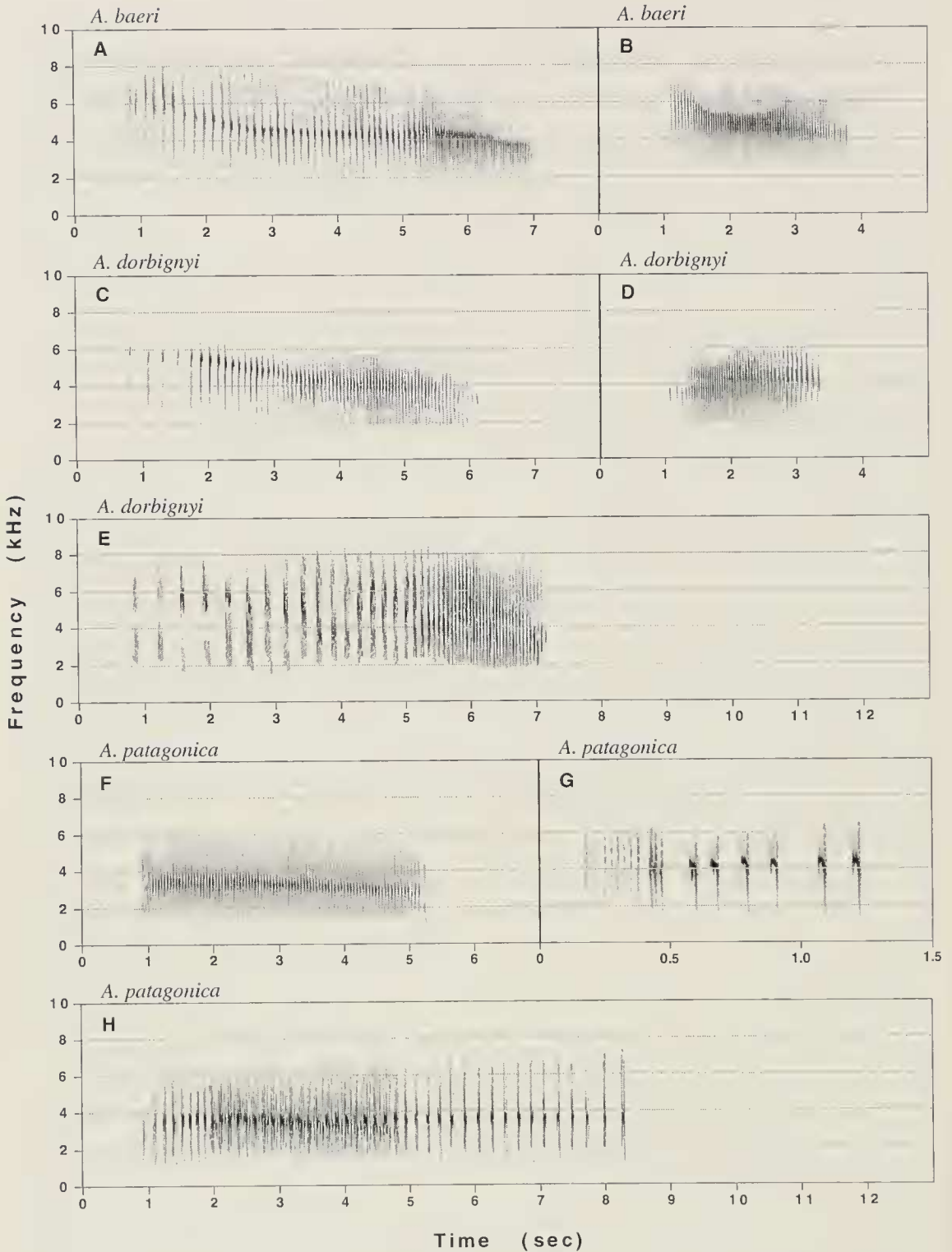


FIG. 8. Sound spectrograms of vocalizations of selected stick-nesting *Asthenes* species. A. *A. baeri*, song after conspecific tape playback (same as natural). Introductory syllables are like one common type of pair-contact call. Argentina: Salta, 05 km S. Rivadavia, 27 Oct. 1989, 260 m. LNS 46142. B. *A. baeri*, a second song-type. Argentina: Salta, 50 km N. J. V. Gonzalez, 28 Oct. 1989, 390 m. LNS 46166. C. *A. dorbignyi*, natural song. Argentina: Jujuy, 13 km N. Humahuaca, 4 Jan. 1988, 3300 m. LNS 43944. D. *A. dorbignyi*, a

sistently comprise series of evenly spaced syllables on a steady or slightly ascending and descending frequency, the whole lasting about 2–4 sec and repeated at intervals of several seconds. Examples are shown in Fig. 9 (A, C, D; selected from recordings of all species except *dorsalis*). Females and immatures sing and sometimes duet with males (Fig. 9A). Individuals are capable of singing several variants of the song; some (especially those in duets) are considerably longer and more complex than the “normal” songs shown in the figures. Calls of *Phacellodomus* delivered while foraging are sharp, penetrating syllables (e.g., Fig. 9B). Somewhat different, single-syllable calls are given while scolding or mobbing. Although songs of *Phacellodomus* are not similar to those of *Acrobatornis* in overall pattern, some variants (e.g., female part of duet in Fig. 9A) sound like the beginning of songs of *Acrobatornis*.

Xenerpestes.—The two species of *Xenerpestes* are little-known; and their relationship within the Furnariidae (in fact, whether they are furnariids at all), is poorly corroborated. One anatomical specimen exists (National Museum of Natural History), but has not been analyzed. Mensural data for *X. singularis* presented in Table 1 (see Fig. 2H for bill and tarsus shapes) are remarkably similar to those of *Acrobatornis*, although *Acrobatornis* is about 15% heavier and has a thicker, more powerfully clawed tarsus. The average tail/wing ratio of four *Xenerpestes singularis* is 0.88, essentially identical to *Acrobatornis* (0.89). Within Furnariidae, the black-and-gray definitive plumage of *Acrobatornis* is approached, albeit superficially, only by the two members of *Xenerpestes*, both of which have restricted distributions in nw South America: *X. minlosi* (Double-banded Graytail) and *X. singularis* (Equatorial Graytail). Both are basically grayish above and have pale superciliaries; *X. minlosi* is black-capped, like *Acrobatornis*; *X. singularis* lacks a contrasting cap and has a rufous-streaked forecrown. *Xenerpestes minlosi* is mostly whitish below, and has two fairly conspicuous, white wingbars; *singularis* has yellowish,

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second song-type. Argentina: Jujuy, 30 km W. La Quiaca, 05 Jan. 1988, 3640 m. LNS 43952. E. *A. dorbignyi*, “harsh” version of natural song-type shown in C (this example also natural). Same individual (and part of same recording) as in D. LNS 43952. F. *A. patagonica*, natural song. Argentina: Rio Negro, 8 km E. Villa Regina, 7 Jan. 1988, 485 m. G. *A. patagonica*, calls of a single individual. Argentina: Chubut, 08 km NNW Trelew, 12 Jan. 1988. LNS 46108. Context for these calls unknown; possibly pair-contact calls. H. *A. patagonica*, pair duet involving same individual shown in F, after playback of song shown in F. LNS 43960. Note almost identical songs, both types, of *A. baeri* and *dorbignyi*; also similarity of the three *Asthenes* species shown in B, D, and H, and of these to song of *Xenerpestes minlosi* in Fig. 9E. Note close similarity of songs of *A. baeri* and *dorbignyi* A and C to songs of *Acrobatornis* in Fig. 6B and C. All recordings by Whitney.

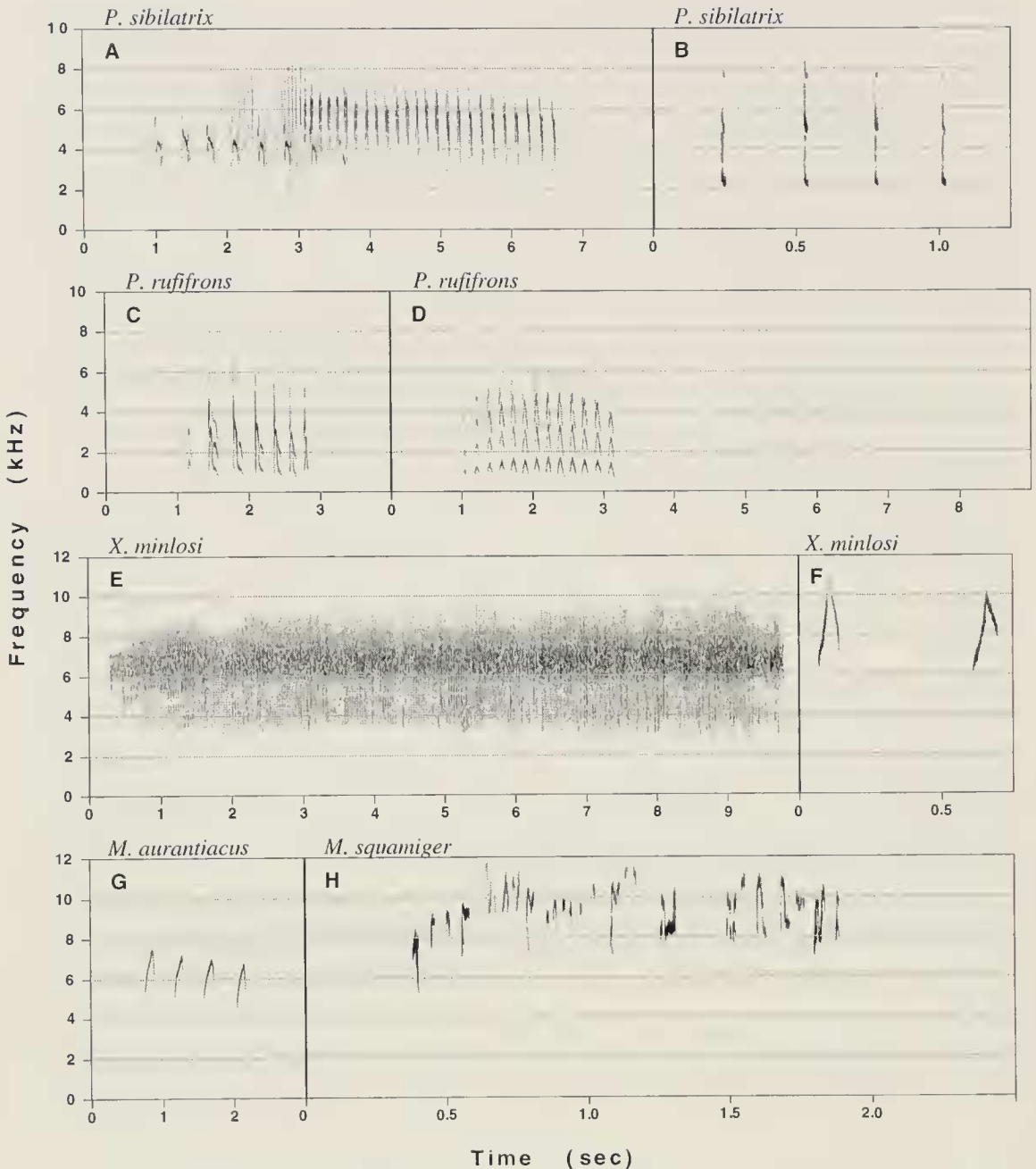


FIG. 9. Sound spectrograms of vocalizations of some other stick-nesting furnariids, and the highly scansorial *Margarornis squamiger*. A. *Phacellodomus sibilatrix*, natural duet at nest. Presumed male begins with more widely spaced syllables centered at about 4 kHz, joined by presumed female singing rapid series at higher frequency. Argentina: Salta, 50 km N. J. V. Gonzalez, 28 Oct. 1989, 390 m. LNS 46163. One common type of male song is similar to that shown in this duet. The presumed female song shown here is similar to the beginning of the song of *Acrobatornis* (Fig. 6B and C). B. *P. sibilatrix*, natural calls, apparently pair-contact. Argentina: Salta, 75 km E. J. V. Gonzalez, 30 Dec. 1987, 330 m. LNS 43831. C. *P. rufifrons*, natural song. Song-type repeated at fairly regular intervals from a stationary perch, often in active nest tree. Brazil: Mato Grosso do Sul, NW, Miranda at "Pousada Caiman," 19 July 1995. D. *P. rufifrons*, natural song. Different song-type from that shown in C. We believe individuals give both song types, and some others; thornbirds

black-streaked underparts and plain, grayish wings. Rectrices of both *Xenerpestes* are grayish and blunt-tipped. They forage actively in the subcanopy of humid forest, almost always with mixed-species flocks, hopping and hitching along the uppersides of limbs, occasionally hanging on leaf-clusters, rarely inverted from limbs, performing gleans and short reaches. They are not scansorial, but Ridgely and Tudor (1994:129) noted for *X. singularis* that "occasionally one briefly creeps along a branch." *Xenerpestes minlosi* often forages in dead leaves and leaf-clusters, and often hangs briefly from foliage. Similar behaviors of *X. singularis* were described by Parker and Parker (1980). The voice of *X. minlosi* is a long, extraordinarily rapidly paced, chattering series of syllables on a steady frequency, beginning quietly and quickly attaining an increased amplitude with slight pulses at irregular intervals; the whole lasts from 3–12 sec (Fig. 9E). We believe pairs sometimes duet. Calls are sharp, thin, almost bisyllabic notes (Fig. 9F). The song differs from that of *Acrobatornis* in its rapid beginning and overall rapid pace, but is approached by the tightly spaced ending of long songs of *Acrobatornis*. One individual singing in the *Acrobatornis* duet shown in Fig. 6D sounded much like *Xenerpestes minlosi* shown in Fig. 9E. In our opinion, the song of *Xenerpestes minlosi*, together with other evidence gathered to date, clearly places this genus in the Furnariidae.

Metopothrix.—*Metopothrix aurantiacus* (Orange-fronted Plushcrown; sole member of the genus), like *Xenerpestes*, is a small, phylogenetically obscure furnariid bearing marked structural resemblance to *Acrobatornis* (Fig. 2I, Table 1). Its tarsus and foot appear to be somewhat stronger than those of *Xenerpestes*, thus closer to *Acrobatornis*, and the average tail/wing ratio of three specimens exactly matches *Acrobatornis* (0.89). Rectrices of *Metopothrix* are grayish and blunt-tipped or slightly pointed. *Metopothrix* usually forages with mixed-species flocks in the subcanopy

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have complex vocal repertoires. Brazil: Bahia, 06 km NW Boa Nova, 9 Mar. 1996. E. *Xenerpestes minlosi*, song after playback (same as natural but longer). Dark band at about 7 kHz is insect noise. Panama: Darién, Cana airstrip in Parque Nacional Darién. Note similarity with songs of stick-nesting *Asthenes* species in Fig. 8B, D, and F, and with songs of *Acrobatornis* in Fig. 6B and C, especially the rapidly paced ending of those songs. It also seems quite similar to one of the individuals singing in the duet of *Acrobatornis* in Fig. 6D. F. *X. minlosi*, natural pair-contact calls. Same individual as E. G. *Metopothrix aurantiacus*, natural song. Peru: Madre de Dios, near Atalaya above "Hacienda Amazonia" lodge, 8 July 1989, about 600 m. Songs vary from 2 to 5 syllables (3 most common). H. *Margarornis squamiger*, natural calls of foraging birds, context unknown. Songs of all *Margarornis* species are sharp, high-frequency syllables like these, but are delivered in a rapid, steady series lasting about 1 sec. All recordings by Whitney.

of forest and well-developed second-growth, mostly in river-created habitats (medium/old whitewater islands, river edge, and foothill forest near river floodplains) in upper Amazonia. It performs gleanings and reaches in live foliage and vine tangles, often at or near the periphery of trees, paying particular attention to the undersides of leaves, including large leaves like those of *Cecropia* species, and very small leaves like those of Leguminosae. Individuals may hang inverted for several seconds at a time, and sometimes crawl in an inverted position. The song of *Metopothrix* is an inconspicuous series of 3–5 evenly spaced, high, thin syllables lasting 1.5–2.5 sec (Fig. 9G). The birds nearly always travel in pairs or family groups, and we have heard a variety of other, quiet, intrafamilial vocalizations. The song and these other vocalizations show little resemblance to those of *Acrobatornis*.

Margarornis.—The three or four (including *M. bellulus* [Beautiful Treerunner]) currently recognized species of *Margarornis* treerunners are small furnariids (Rudge and Raikow 1992a) that inhabit humid montane forest of southern Middle America and the Andes. The bill of *Margarornis squamiger* is shaped much like that of *Acrobatornis*, but is slightly longer, as is the tail/wing ratio (average of 3 specimens 0.95); body mass is also greater (Fig. 2J; Table 1). Rectrices are acuminate with the rachis extending slightly beyond the feather vanes. *Margarornis* species forage with mixed-species flocks in the forest interior. They are highly scansorial, almost constantly creeping along limbs, both upper- and undersides, and sometimes up tree trunks, performing gleanings and probes in moss, epiphytic growth, and dead leaf clusters. They sometimes use the tail as a prop when stationary (Slud 1964, Wetmore 1972, pers. observ., all species). Individuals may hang inverted on balls of moss or leaf clusters for several seconds. The scansorial behavior of *Margarornis* species appears to be much like that of *Acrobatornis*, although we have not been able to determine whether the locomotory and grasping action of the legs and feet of the two are the same. Dissection of hindlimb musculature of *Acrobatornis*, in comparison with that reported by Rudge and Raikow (1992b) for their *Margarornis* assemblage, would perhaps be enlightening in this regard. *Acrobatornis* spends much time hanging from and crawling through foliage, a search-method rarely practiced by *Margarornis* species. Songs of all *Margarornis* treerunners consist of short, sharp, high-frequency syllables delivered in a steady series lasting about 1 sec. Calls are like individual syllables of the song, but are delivered at irregular intervals (i.e., not in repetitive series; Fig. 9H, selected from recordings of all species). Their vocalization seem quite different from those of *Acrobatornis*.

So what is Acrobatornis most like?—Overall morphological compari-

sons from both Table 1 and Fig. 2 show particularly close parallels in bill shape, tail/wing ratio, and all standard absolute measurements between *Acrobatornis*, *Metopothrix*, and *Xenerpestes*, and lesser similarity of these with *Margarornis*. The acuminate and strongly excised central rectrices of *Acrobatornis* are different from the blunt rectrices of these others, but are like several species of *Cranioleuca*. Among stick-nesting *Asthenes*, *A. baeri* and *A. patagonica* seem close to *Acrobatornis*. We judge plumage parallels (overall pattern and regions of contrast) strongest with *Cranioleuca* (notwithstanding that no species are colored like *Acrobatornis*) and *Xenerpestes*. Comparisons of vocalizations, especially songs and adult contact (foraging) calls, show a strikingly close similarity to one song-type of some stick-nesting *Asthenes*, and notable parallels with *Xenerpestes*. Single-syllable foraging or pair-contact calls of *Acrobatornis* appear most like those of montane *Cranioleuca* species, but this is more complicated by the difficulty of judging homology of these vocalizations. The hanging and inverted-scansorial foraging maneuvers of *Acrobatornis* are approached most notably by *Margarornis* and *Cranioleuca* and, to a lesser extent, *Metopothrix* and *Xenerpestes*, and some other arboreal furnariids. *Asthenes* are highly terrestrial foragers, and bear no resemblance to *Acrobatornis* in this regard.

Our intrafamilial comparisons of morphology, vocalizations, and foraging behavior, together with nest architecture and placement discussed by Whitney et al. (1996), suggest that *Acrobatornis* is related to stick-nesting *Asthenes canasteros* and *Cranioleuca spinetails*, and may be the closest relative of the *Xenerpestes* graytails and the monotypic *Metopothrix*. It is, of course, impossible at the moment to know how many of the similarities among these genera might be the result of convergence. Our hypotheses are, at least, supported by multiple, corroborative parallels, and may be helpful in orienting future, especially biochemical, investigation. Pertinent specimens are at hand.

On the origin of Acrobatornis.—As pointed out by Remsen (1984), “Although reconstructions of historical zoogeographic events often contain more speculation than warranted by available data, such historical hypotheses are a necessary part of a zoogeographic and taxonomic analysis.” We postulate that *Acrobatornis fonsecai* represents a relict from an expansion of stick-nesting furnariids from a (probably arid or semi-arid) Chaco-Patagonian/Pantanal distributional center that survived in arboreal habitats on ancient and stable soils in southeastern Bahia. Soils in the restricted region from Feira de Santana south to the vicinity of Camacan and Pau-Brasil are formed primarily of decomposed crystalline rock of lower Precambrian age known as the Jequié Complex, and are among the oldest soils on the planet (Caldeira 1954, RADAMBRASIL 1981). The

entire known distribution of *Acrobatornis* is encompassed in this area. *Acrobatornis* appears to be absent from forests on the sandy fluvio-marine plain (“Planície fluvio-marinha” RADAMBRASIL 1981). It may inhabit evergreen seasonal forest (“mata de tabuleiro”), however, where the cocoa-growing region approaches the coast between Itabuna and Ilheus. This forest is also mostly on soils of the Jequié Complex. The fact that these soils are extremely old and have apparently been stable for a long period of time may help explain the peculiar, relictual distribution of *Acrobatornis*.

As the arid and semi-arid periods that had originally allowed it to reach the region eventually gave way to a more mesic environment with taller trees, *Acrobatornis* survived by gradually adapting to build its nests in the relatively xeric crowns of trees, especially Leguminosae. These wide, leguminaceous canopies, with their small leaves and open, layered stratification of limbs, are indeed hot and dry, supporting virtually no epiphytic growth. *Acrobatornis* may have managed to survive through successful ecological adaptation; we suspect the nest and vocalizations have undergone little structural modification.

A quite different hypothesis of origin of *Acrobatornis* in the humid forest of southeastern Bahia gives primary importance to analysis of distributions of birds syntopic with it today. Almost all (if not all) birds inhabiting the lowland forest of southeastern Bahia, from terrestrial species to canopy species, are unequivocally most closely related to (and probably derived from) Amazonian stock (Willis 1992, Whitney et al. 1995). Why should *Acrobatornis* be any different? For *Acrobatornis*, unlike all other birds in this region of Bahia, it is difficult to identify and justify a contemporary link to an Amazonian relative. In this context, however, we recall various similarities to upper Amazonian *Metopothrix* and, in the subtropical forests of the east slope of the Andes and in trans-Andean lowlands, *Xenerpestes*. Could there be (or could there have been) an *Acrobatornis*-like bird in the vast and little-known canopies of Amazonia? The answer to this riddle may lie in elucidation of such poorly understood factors as edaphic habitat maintenance and variable distribution of vegetation types.

Conservation: the destiny of Acrobatornis.—The area of occurrence of *Acrobatornis fonsecai* lies entirely within the nucleus of the cocoa-growing region of southern Bahia. Up to now, it has maintained apparently viable numbers in harmony with intense anthropogenic alteration of its habitat and pervasive human presence (Fig. 10). Although virtually no undisturbed forest remains in the lowlands of the Rio Jequitinhonha-Rio de Contas interfluvium, it is clear that the persistence of the “cabruca” canopies shading the cocoa guarantees the survival of a considerable por-



FIG. 10. House and cocoa plantation on the side of the major highway BR-101, about 14 km N. of Itabuna, Bahia. Tall, native trees shading cocoa plantations such as this provide acceptable breeding habitat for *Acrobatornis fonsecai* and a wide variety of other birds. A nest of *Acrobatornis* is visible as a dark spot in the upper left of the tall tree in the center of the photograph. Photo by Whitney.

tion of the indigenous canopy fauna and flora, including the avifauna (Alves 1990, pers. observ.), and maintains corridors for fauna only seasonally or temporally dependent. The cabruca system of growing cocoa has preserved, to a considerable extent, the humid microclimate upon which many forms of life depend, and must be responsible on a large scale for maintenance of the local hydrologic regime. Cabruca canopies are in some areas almost continuous over large tracts, and hold magnificent adult trees of a wide variety of species. Many individuals of these mature trees must be near the end of their lifespans, however, and there are no seedlings to regenerate them because of constant weeding of the understory in cocoa plantations. Consequences of this were summarized by Mori et al. (1981): "A system of clear-cut and burn with the subsequent replacement of native trees by monotypic stands of [introduced] *Erythrina fusca* has been developed. In this system, banana trees are used to shade the young cocoa plants and to provide income until the cocoa trees produce fruit. Fertilizers, herbicides, and pesticides are used in both systems [this and cabruca] but more so in the cut-and-burn system." This system is called "derruba total" (Alger and Caldas 1996).

Cocoa was introduced into southern Bahia from the Amazon in 1746, and has been the most important crop in that region ever since (Mori et al. 1983). In their concise and well-balanced discussion of the history of cocoa cultivation and the current socioeconomic problems confronting the cocoa growers of southeastern Bahia, Alger and Caldas (1996) reported that during a brief period in the 1970s, cocoa from southern Bahia was the second most important export for Brazil, after coffee. During this era, more than half a million hectares were planted in cocoa, and the industry flourished. Between 1986 and 1992, however, the international price for cocoa fell from US \$2500 to \$1000 per ton, hitting the industry hard. Then, in 1989, came the accidental introduction of the fungus *Crinipellis pernicioso*, which causes the disease known as "witch's-broom." According to the Executive Commission for the Economic Recovery of the Cocoa Industry (CEPLAC), as of March 1995, the disease had spread through more than 70% of the cultivated region. Control of the fungus was expensive and ultimately not effective. Cocoa production plummeted, with dire consequences for the livelihoods of tens of thousands of people and, concomitantly, for the remnant forests of southeastern Bahia. For example, the newspaper *A Tarde* of Salvador, Bahia, for 16 Feb. 1996 (article by Rosa M. Carvalho), reported that Hershey, the largest chocolate producer in the United States and perhaps the biggest buyer of Bahian cocoa, was on the verge of terminating contracts with Bahian growers because of the drastic decline in cocoa production. And Alger and Caldas (1996) reported how plantation owners, although often with reluctance, have little choice but to cut their valuable old trees and sell the timber for immediate cash. They explained, "The shift from cocoa to other crops or for livestock pasture is not considered remunerative. Deforestation for timber sale is generating pasture more because of lack of alternatives than enthusiasm for livestock raising." They went on to describe how many of the largest plantation owners, faced with steady losses, are highly amenable to preserving their remnant forests, but receive little support from the government to do so, and emphasized the importance of establishing economic incentives for land preservation, such as subsidies for formation of private reserves.

As it stands now, there is not one officially protected area of forest in the range of *Acrobatornis*, although it may eventually be found in the nearby Una Reserve, the avifauna of which is poorly known. This reserve is the stronghold of one of the rarest primates in the world, *Leontopithecus chrysomelas* (Golden-headed Lion Tamarin), which has a distribution almost exactly coincident with that of *Acrobatornis*: remnant lowland forest between the Rio de Contas and the Rio Jequitinhonha. Even a tribe of Indians, the Kamakan, was indigenous to the still more restricted region

between the Rio de Contas and the Rio Pardo; the modern town, Camacan, takes their name. The last member of the Kamakan died in 1938 (Viveiros de Castro 1986).

The only practical means that we can imagine of preserving a population of *Acrobatornis* and the other fauna in this region is the immediate purchase of two large, separate blocks, one in the serra das Lontras and one in the serra Bonita, that encompass forest from the highest elevations in these ranges down to near sea-level. Such blocks must incorporate extensive cabruca canopies in contact with healthy forest canopies. The cocoa could then be removed and seedlings of native tree species planted to replace the aging adults. Local people, especially large land-owners, must be integrally involved in establishment and maintenance of these forest reserves. This land is for sale today, and the price and socio-political climate are favorable (Alger and Caldas 1996).

We will never cease to be amazed at how this striking little bird that constructs conspicuous stick-nests in treetops along the congested highway BR-101 could have been overlooked so completely. Its discovery serves to remind us of how much remains to be learned, even as it fades from existence.

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WILSON ORNITHOLOGICAL SOCIETY MEETING

The 78th Meeting of the Wilson Ornithological Society will be held 17–20 Apr., 1997, Kansas State Univ., Manhattan, KS. The Society will meet jointly with the Kansas Ornithological Society. Registration materials and call for papers will be sent to members in December 1996. Inquiries about the scientific program should be directed to JOHN C. KRICHER, Biology Dept., Wheaton College, Norton, MA 02766 (508-286-3950; jkricher@wheatonma.edu). Local chair is John L. Zimmerman, Div. Biology–Ackert Hall, KSU, Manhattan, KS 66506-4901 (913-532-6659 or -6615).